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TRANSACTIONS

OF THE

INDIANA

Horticultural Society.

1880.

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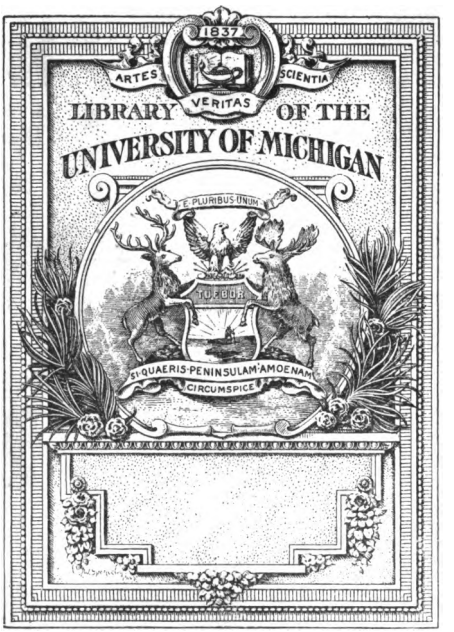

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TRANSACTIONS

OF THE

INDIANA HORTICULTURAL SOCIETY

FOR 1880,

BEING THE

PROCEEDINGS OF THE TWENTIETH ANNUAL SESSION,

HELD AT

CRAWFORDSVILLE, MONTGOMERY COUNTY,

DECEMBER 21, 22 AND 23, 1880,

TOGETHER WITH REPORTS FROM LOCAL SOCIETIES,
ESSAYS, PAPERS, ETC.

By W. H. RAGAN, Secretary.

INDIANAPOLIS:
CARLON AND HOLLENBECK, PRINTERS AND BINDERS.
1881.

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CLAYTON, INDIANA, January 10, 1881.

To His Excellency, Albert G. Porter, Governor:

I herewith have the honor of submitting the twentieth annual report of the Indiana Horticultural Society, with accompanying papers, reports, essays, etc., in compliance with legal requirements.

Very respectfully,

W. H. RAGAN, *Secretary.*

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OFFICERS

OF THE

INDIANA HORTICULTURAL SOCIETY,

FOR THE YEAR 1881.

SYLVESTER JOHNSON, Irvington, President.
S. BURNETT, Vincennes, First Vice-President.
DR. C. RATHBURN, Salem, Second Vice-President.
J. W. RAGAN, Fillmore, Third Vice-President.
D. E. HOFFMAN, Winchester, Fourth Vice-President.
W. C. STEELE, Laporte, Fifth Vice-President.
I. D. G. NELSON, Fort Wayne, Sixth Vice-President.
W. H. RAGAN, Clayton, Secretary.
DANIEL COX, Cartersburg, Treasurer.

EXECUTIVE COMMITTEE.

J. C. RATLIFF, Richmond.
DR. A. FURNAS, Danville.
L. B. CUSTER, Logansport.

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VICE PRESIDENTS

AND

The Counties Composing Their Respective Fruit Districts.

FIRST DISTRICT—S. Burnett, Vice President. Crawford, Daviess, Dubois Gibson, Greene, Knox, Lawrence, Martin, Orange, Perry, Pike, Posey, Spencer, Sullivan, Vanderburgh and Warrick.

SECOND DISTRICT—Dr. C. Rathburn, Vice President. Bartholomew, Brown, Clarke, Dearborn, Decatur, Floyd, Franklin, Harrison, Jackson, Jefferson, Jennings, Ohio, Ripley, Scott, Switzerland and Washington.

THIRD DISTRICT—J. W. Ragan, Vice President. Boone, Clay, Clinton, Fountain, Hendricks, Monroe, Montgomery, Morgan, Owen, Parke, Putnam, Tippecanoe, Vermillion, Vigo and Warren.

FOURTH DISTRICT—D. E. Hoffman, Vice President. Blackford, Delaware, Fayette, Grant, Hancock, Hamilton, Henry, Howard, Jay, Johnson, Madison, Marion, Randolph, Rush, Shelby, Tipton, Union and Wayne.

FIFTH DISTRICT—W. C. Steele, Vice President. Benton, Cass, Carroll, Fulton, Jasper, Lake, Laporte, Marshall, Newton, Porter, Pulaski, Starke, St. Joseph and White.

SIXTH DISTRICT—I. D. G. Nelson, Vice President. Adams, Allen, DeKalb, Elkhart, Huntington, Kosciusko, Lagrange, Miami, Noble, Steuben, Wabash, Wells and Whitley.

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CONSTITUTION

OF THE

INDIANA HORTICULTURAL SOCIETY.

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1. This Society shall be known as "INDIANA HORTICULTURAL SOCIETY."

2. Its officers shall consist of a President, six Vice Presidents (who shall be elected, one from each Fruit District, and by virtue of their election, members without fee for the time for which they are chosen), Secretary, Treasurer and Executive Committee of three.

3. The President shall preside at and conduct all meetings of the Society, and in his absence the Vice Presidents, in their order, shall perform the same duties.

4. The Secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all money received from members, or otherwise, to the Treasurer, on his receipt; shall receive and answer all communications addressed to the Society; establish and maintain correspondence with all local, county, district and State Horticultural Societies, and secure by exchange their transactions, as far as possible, to aid the President, as an executive officer, in the dispatch of business relating to the meetings of the Society, preparing and publishing circulars and notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of the transactions for the current year.

5. The Treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the Secretary, countersigned by the President.

6. The officers shall be elected separately and annually, by a ballot vote, and hold their office until their snccessors are elected.

7. The objects of the Society being to collect, condense and collate information relative to all varieties of fruits, and dispense the same among the people, every member, except Vice Presidents, shall pay into the treasury one dollar a year for the purpose of publishing, and other expenses. Any per-

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son interested in horticulture may become a member by forwarding to the Treasurer or Secretary the fee of membership.

8. Every member shall be entitled to a copy of the Transactions of the Society as often as the same shall be published.

9. The President, Secretary and Executive Committee may call a meeting of the Society at any time and place they may consider advisable, by a notice of thirty days in the public press.

10. It shall be the duty of each Vice-President to make an annual report to the Socicty upon the fruit crop in his respective district, together with such recommendations and suggestions as may seem best for the interests and advancements of horticultural knowledge within said district, which shall be, by the Secretary, published in the Transactions of the Society for the year in which such reports are made.

11. This Society shall hold its annual sessions on the third Tuesday in December in each year, and at such place as the Society shall designate at its previous meeting. It shall be the duty of the Executive Committee to procure rooms and make all necessary arrangements for the meetings of the Society, to make out a programme of business for each meeting, and attend to such other duties as the Society may from time to time direct.

12. The officers of this Society shall constitute a Board of Horticulture, five of whom shall constitute a quorum for the transaction of business, the officers of the Society to be officers of the Board, said Board to meet immediately on the adjournment of the Society, and afterwards on their own adjournment. It shall be the duty of the Board of Horticulture to collect horticultural information, and they shall be authorized to employ an agent or agents to visit different portions of our State or adjoining States to collect information of general interest, and shall be authorized to draw on the Treasurer for money to pay the expenses of said agent or agents, when there is money in the treasury not otherwise needed, and said Board shall make full and accurate reports of their proceedings, with all horticultural information collected, to the regular meeting of the Society.

13. By-laws and alterations in the constitution, for the purpose of governing further wants of the Society, may be enacted by a majority of the members present at any regular session.

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HONORARY MEMBERS.

Dr. J. A. Warder, North Bend, O.

Z. S. Ragan, Independence, Mo.

J. C. Weinberger, St. Helena, Cal.

Robert Manning, Salem, Mass.

N. Ohmer, Dayton, O.

Walter G. Stevens, Centerville, Ind.

Mrs. M. P. Haynes, Richmond, Ind.

Mrs. Helen V. Austin, Richmond, Ind.

John C. Teas, Carthage, Mo.

Charles Downing, Newburg, N. Y.

Prof. R. T. Brown, Indianapolis, Ind.

I. D. G. Nelson, Fort Wayne, Ind.

Cornelius Ratliff, Richmond, Ind.

Gov. R. W. Furnas, Brownville, Neb.

S. S. Richie, New Paris O.

Prof. T. J. Burrill, Champaign, Ill.

James G. Kingsbury, Indianapolis, Ind.

J. W. Robison, Tremont, Ill.

J. S. Beatty, Simpsonville, Ky.

Charles Lowder, Salem, Ia.

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LIST OF MEMBERS FOR 1881.

First Vice President, S. Burnett, Vincennes.
Second Vice President, Dr. C. Rathbun, Salem.
Third Vice President, J. W. Ragan, Fillmore.
Fourth Vice President, D. E. Hoffman, Winchester.
Fifth Vice President, W. C. Steele, Laporte.
Sixth Vice President, I. D. G. Nelson, Ft. Wayne.

Emery Albertson, Bridgeport, Ind.
John Q. Adams, Evansville, Ind.
Abner Allen, Waubaunsee, Kansas.
Mrs. Helen V. Austin, Richmond, Ind.
Addison Bybee, Bridgeport, Ind.
P. H. Burns, Crawfordsville, Ind
C. Blair, Crawfordsville, Ind.
Daniel Bulla, Richmond, Ind.
T. C. Barnum, Indianapolis, Ind.
Fielding Beeler, Indianapolis, Ind.
I. N. Barker, Thorntown, Ind.
Wm. N. Burt, Indianapolis, Ind.
F. M. Buker, Ligonier, Ind.
Mrs. Lizzie S. Byers, Terre Haute, Ind.
Geo. W. Blue, Indianapolis, Ind.
Jesse H. Blair, Indianapolis, Ind.
H. Culbertson, Lincoln, Nebraska.
Fletcher Carter, Pittsboro, Ind.
Matthew Crawford, Cuyahoga Falls, O.
Prof. J. M. Coulter, Crawfordsville, Ind.
V. W. Clark, Crawfordsville, Ind.
Daniel Cox, Cartersburg, Ind.
Granville Cowing, Muncie, Ind.
Wm. Carmichael, Bellemore, Ind.
H. M. Clark, Covington, Ind.
James Calloway, Ladoga, Ind.
L. B. Custer, Logansport, Ind.
Jas. S. Collins, Columbia City, Ind.
Jasper N. Davidson, Crawfordsville, Ind.
E. A. Eickhoff, Indianapolis, Ind.
John Freeman, Knigtstown, Ind.
F. H. Foust, Columbia City, Ind.
John W. Furnas, Valley Mills, Ind.
Calvin Fletcher, Spencer, Ind.
Dr. W. P. Foster, Muncie, Ind.
John Fullhart, Muncie, Ind.
Dr. A. Furnas, Danville, Ind.
J. A. Foot, Terre Haute, Ind.
Jo Grubbs, Crawfordsville, Ind.
M. H. Galey, Crawfordsville, Ind.
Joseph Gilbert, Terre Haute, Ind.
Dr. T. V. Gifford, Kokomo, Ind.
Miss L. J. Hiatt, Crawfordsville, Ind.
Jacob W. Hutton, Crawfordsville, Ind.
D. E. Hoffman, Winchester, Ind.
Ira Hadley, Sylvania, Ind.
L. Heinl, Terre Haute, Ind.
W. W. Hamilton, Greensburg, Ind.
H. P. Hanford, Bristol, Ind.
Nathan Harvey, Bloomingdale, Ind.
Mrs. Julia B. Hosford, Terre Haute, Ind.
John Holloway, Darlington, Ind.
C. M. Hobbs, Bridgeport, Ind.
Alfred Hadley, Centre Valley, Ind.
Wm. Holland, Plymouth, Ind.
T. Hullman, Sr., Terre Haute, Ind.
Prof. C. L. Ingersoll, Lafayette, Ind.
W. S. Irwin, Bowers, Ind.
H. S. Jennings, Crawfordsville, Ind.
Sylvester Johnson, Irvington, Ind.

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MEMBERS—Continued.

F. H. King, River Falls, Wis.
Jacob Kennedy, Lizton, Ind.
P. S. Kennedy, Crawfordsville, Ind.
Dr. T. J. Leech, Crawfordsville, Ind.
John Lockridge, Mace, Ind.
J. A. Little, Cartersburg, Ind.
Jonathan L. Moffitt, Mooresville, Ind.
B. N. McKinstry, Grant Park, Ill.
J. C. Maxwell, Crawfordsville, Ind.
H. Mankedick, Indianapolis, Ind.
Geo. W. Mitchell, Bloomingdale, Ind.
Dr. R. S. Mitchell, Richmond, Ind.
Thomas B. Morris, Richmond, Ind.
Mrs. Hattie R. Moore, Greencastle, Ind.
Silas Peterson, Potato Creek, Ind.
Z. Pefley, Ladoga, Ind.
A. B. Pegg, Terre Haute, Ind.
J. H. Priest, Greencastle, Ind.
H. A. Purdie, Boston, Mass.
F. M. Polk, Tobinsport, Ind.
John M. Pitcher, Sugar Creek, Ind.
G. Poindexter, Blue Lick, Ind.
Walter J. Quick, Columbus, Ind.
A. J. Royalty, Crawfordsville, Ind.
Wm. Ritchey, Brooklyn, Ind.
W. A. Ragan, Clayton, Ind.
W. H. Ragan, Clayton, Ind.
R. M. Ragan, Fillmore, Ind.
Dr. J. H. Robinson, Fillmore, Ind.
J. C. Ratliff, Richmond, Ind.
Walter S. Ratliff, Richmond, Ind.
T. W. W. Sunman, Spades, Ind.
Wm. Sigerson, Wabash, Ind.
H. M. Simpson, Vincennes, Ind.
S. T. Sterling, Camden, Ind.
O. C. Sterling, Camden, Ind.
Marion Steele, Greenfield, Ind.
W. C. Steele, Laporte, Ind.
W. C. Sleeper, Oxford, Ind.
Prof. L. A. Stockwell, Greencastle, Ind.
Geo. C. Thompson, Southport, Ind.
E. Y. Teas, Dunreith, Ind.
W. H. Vance, Springport, Ind.
A. W. Wells & Co., St. Joseph, Mich.
Mrs. Nevie Woods, Stilesville, Ind.
D. F. Willey, Charlestown, Ind.
T. J. West, Crawfordsville, Ind.
W. A. Workman, Greencastle, Ind.
Geo. Young, Greensburg, Ind.

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PROCEEDINGS

OF THE

Twentieth Annual Meeting

HELD AT

CRAWFORDSVILLE, MONTGOMERY CO., IND.

December 21, 22 *and* 23, 1880.

FIRST DAY.

MORNING SESSION.

At an early hour on Tuesday, December 21, 1880, the members of the Indiana Horticultural Society assembled in the Circuit Court room, in the city of Crawfordsville, which had been handsomely prepared for the occasion by the Montgomery County Society with fruit tables, mottoes and beautiful exotic plants and flowers. Many of the members came loaded with fruits and vegetables for exhibition; others (among whom were a number from other States), who were prevented from attending in person, had remembered the occasion through the instrumentality of the express companies, while all together were busy in the necessary, and exceedingly pleasant work of preparing for the twentieth annual session.

The work of arranging for the exhibition (in the corridor of the court house, and by no means inferior to any heretofore made by the Society,) with the usual greetings of personal friendship, consumed the forenoon hours; when an informal recess was taken until 1:30 o'clock, P. M.

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AFTERNOON SESSION.

At half past one o'clock, P. M., the meeting was called to order by President Johnson, after which the Rev. J. P. Stratton offered an appropriate prayer.

Hon. J. W. Ramsey, Mayor of the city of Crawfordsville, welcomed the Society in the following appropriate remarks:

Mr. President, Officers and Members of the Indiana Horticultural Society:

I have been requested to speak some words of welcome to you on this occasion, and I most cheerfully consent. My pleasure in meeting you and welcoming you to our city is doubly enhanced by the fact that in the President of your Society I recognize an old and cherished friend, and so long as the interests of your Society are guarded by the integrity and honesty of purpose that have always characterized him, you need have no fears of final success.

We regard the great enterprise in which you are engaged as worthy of every encouragement. We are told that the Lord planted a garden, eastward in Eden, and there He placed the man whom He had created. It would seem from this that the proper place for man to live is in a garden, and that his daily food was largely intended to be made up of fruit. In any event we all know that a garden is a good thing, and a good place to live in. No country can be prosperous without happy homes, and no home can be a happy home without a garden. The truth is, every man should have a home, and every home should be in the midst of a garden. This I believe to be the design of Providence for a happy life of innocence and purity. And when I speak of a garden I mean a garden in its wide and Scriptural sense, with trees and vegetables, and fruits and flowers; I mean a garden with apples, and pears, and peaches, and strawberries, and melons, and potatoes, and cabbage, and celery, and, in short, everything in the shape of vegetables and fruit that is good to eat.

We seldom see sickly children where the table is loaded with vegetables and fruits. The child, before its appetite is perverted, will always exchange a piece of fat meat for a big red apple, and throw all else under the table for a dish of good ripe strawberries. And I have heard of instances where the young boy (and often times the older) have risked an attack from the most vicious dog in order to obtain a few bunches of tempting grapes from a neighbor's enclosure. And what is it that a boy would not risk to obtain a large red-meated watermelon out of sombeody's, or anybody's, melon patch? The strong appetite of children for the products of the garden is the constant cry of nature to you to persevere in your noble work. I trust, gentlemen, that your deliberations and efforts may result in giving us better gardens and more of them gardens, with delicious fruits, nutritious vegetables and blooming flowers, and in the near future every family in the State may have a happy home in the midst of a well cultivated and beautiful garden where there is no forbidden fruit. Once more, I bid you a hearty

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welcome to our city, and trust your meeting may be a pleasant and profitable one to you and to our people, and that your coming together here will awaken new zeal in the great interest your society was organized to promote and foster.

To this cordial welcome, President Johnson responded:

Mr. Mayor and Citizens of the City of Crawfordsville:

On behalf of the Indiana Horticultural Society, I thank you for the kind words of welcome to which we have just listened. They prove to us that, noted as your city is for its literary and scientific institutions, you have not lost sight of, nor turned a deaf ear, to that noble art which our Society was organized to perpetuate and improve. Science is of value only as it may be used to improve the arts; and your scientific institutions are only valuable as they direct the mind of the student how to apply science in the improvement of the arts. Hence, we horticulturists of Indiana, who have been striving for more than twenty years to perfect our art, without reaching the desired end, are pleased to meet with you here, not under the shade, but rather in the sunshine of your institutions, that the light of your science may be applied to our favorite art.

You have referred to the innocence and purity of the first garden. Such it was, and such our gardens may yet become. But for the little indiscretion of our first parents, much of the toil and labor of modern horticulturists might be avoided. "Thorns and thistles shall it bring forth to thee."

A small amount of labor would rid the garden of these, so that curse would, by an industrious horticulturist, soon be removed. "The serpent was more subtle than the beast of the field," but man has proved himself to be more subtle than either, and has introduced practices into the garden which have resulted in more and greater curses than those pronounced upon our first parents. Apples are turned into alcoholic drinks, and the canker-worm and codling moth at once make their appearance. Peaches are transformed into brandy, and the yellows and white grub destroy the trees. Grapes are made into wine, and phylloxera and rot destroy the vines and fruit. It is a remarkable fact that these diseases prevail most in wine making districts. We try to get rid of these effects, while at the same time we allow the causes to remain. Let us as horticulturists cease to do evil and learn to do well; then may our gardens become, indeed, the abodes of innocence and purity. Again I thank you for this cordial welcome, and extend to all the citizens of Crawfordsville and vicinity, an invitation to meet and participate with us in all our deliberations, and thereby add to the interest of our meetings.

Prof. C. L. Ingersoll, of Purdue University, was then introduced, who discussed at some length and with ability the very appropriate question,

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HOW TO INTEREST YOUNG MEN IN OUR SOCIETY.

Mr President and Members:

It is with feelings of embarrassment that I attempt to present anything on this subject before an audience almost all my seniors and many of whom have reared families of boys that have gone out and some of them, perhaps, doing good work in this line.

In my labors in teaching I have been brought constantly in contact with young men, and I never stand before a class for the first time without thinking of the grand *possibilities* before those young men, who are just starting out so full of hope and vigor for the race in life. There may be great differences in the mental power of these individuals, but labor and persistent effort will achieve wonders when directed properly. Following closely on this thought comes the question to my mind, "What are the probabilities in regard to these young men?" My heart has been made sad as I have reflected that "the race is not always to the swift nor the battle to the strong," and I have felt that some of the brightest and most promising of these would probably make shipwreck of their opportunities, and in the end, perhaps, bring disgrace and dishonor on the names which they bear and the parents who have reared them and who have so fondly hoped for honor and blessing at their hands. As I look over this audience I am more firmly impressed with the thought that something should be done to interest our young men. The young men to fill the places of the older portion of the Society as they must drop out, do not seem to be joining in and taking hold of the work as we could wish to see them do. There must be a reason for this, and in searching for it let us look at the character and disposition of our young men of promise. Everyone who has had the control of boys knows that in order to reach the best results we must study the disposition and desire of each individual, and to so present instruction as to adapt itself to the wants of all.

1. These young men are vivacious; they love recreation; and many a hard task would be lightened and difficult job the easier accomplished if enterprise and intelligence enter into the work and give the mind food for thought. It may, in such a case, become recreation.

2. They are energetic; they must do something. They are brim-full of life and can not be idle, but must be on the move, and if something that is of value is not presented for work, idleness and an imaginative mind will do the rest and furnish that which is a detriment to him. How often does the boy want to do the work which requires the skill, the thought, the judgment; but is restrained and is given the drudgery; he has to turn grindstone, or do other work that is distasteful to the parent.

3. With both these valuable traits of character, we have another not quite so valuable; they are fickle. They love change; consequently we must give them change of work that will require judgment and thought, keep the mind well employed during the time that the hands are laboring, and not keep them at one thing until they are thoroughly sick and disgusted with the work.

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These, in a few words, are some of the traits of character developed by our best young men—just such young men as we need to come into our Society and work, and, sooner or later, fill the places of those who must soon fail to meet and work with us.

Having noticed the character of these young men, let us see what our Society offers as an inducement for them to join and work in the advancement of Horticulture. The work of the Society is divided naturally into work outside and work inside, or in the sessions.

The work outside takes in the report on all old varieties of fruit from time to time for various purposes. The proving of new varieties offered for our consideration and approval; the starting of new varieties or the propagation of seedlings, or cross fertilized varieties, and lastly, the comparing of varieties grown on various soils. This comprises the work on fruit and requires all the care in observation and all the good judgment any young men may possess. While this portion demands good observation, we have a work outside that demands good, trained observers. The Horticultural Society should have men in various sections who shall observe and report on the habits, transformations, and devastations of our injurious insects. These are constantly changing. We have new insect enemies making themselves known every year, as they are driven from their natural coverts—the forests,—by their decrease and the short amount of their natural food. In addition to these we should have meteorological observers in at least ten different sections of our State, who shall carefully observe the temperature and atmospheric changes and report the same. This will give young men a good field to develop their powers of observation and learn much of the mysteries of nature, which only are mysterious to those who wilfully close their eyes; or as the Scriptures say: "Seeing, see not." There is a difference between seeing and observing. Many persons see things all their lives and yet never observe the simplest facts in connection with any phenomenon. Thousands of persons had seen the falling of apples, but only a Newton observed in the falling apple the action of the unseen force of gravity.

In the Society the young men can only be interested by giving them some work; that being such as they can accomplish. Put them on the programme to prepare papers on subjects they can best work up; put them on committees, and if possible get them on between two old workers in the Society who shall thus initiate this younger member and lead him on, thus educating him unconsciously in the work. Let them act as judges on fruit, no matter if they are not thoroughly posted in pomology; one young member on such a committee will in two or three years become one of your most valuable men. The same energy and liveliness of disposition will assist in making him an adept in the work. Finally, when they have worked and given satisfaction in subordinate positions, and when they shall have proved by their attendance and zeal that they are really one *with* us then reward them by trusting them and making them officers in the Society. Show by this that you have confidence in them, and I firmly believe you will be well rewarded for such trust reposed in them.

The foregoing are some of the lines of work which open up before one who becomes a member of our Society. But is there anything in this line incompatible with the character of our typical young man?

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Can he be induced to join us and take up this work for the love of it? In answer to this I will notice two or three reasons why our young men may prefer other lines of work; and,

1. Horticultural work in its richest fields, does not hold out the hope of immediate reward, either in the propagation of new sorts or the raising of fruit for profit. In the first case we have the history of the labors of such men as Van Mons in pears and Dr. Kirtland in cherries. Many persons with grapes, and Mr. Bennett's experience with roses in cross fertilization, as given in a recent number of the Gardener's Monthly. The length of time required to bring out such flowers as tulips are additional examples of the weary hours one must spend, and after years of effort finally be cheated by Nature, or to say the least, disappointed. If one plants fruit trees for profit, he must wait patiently for some time before he reaps his rich rewards. In getting young men to take up such work I have found that there must be some previous education, either in college or otherwise, which shall incline the person in that direction. My attention was more fully directed to this by glancing over the programme of a recent meeting of the Michigan Horticultural Society, on which I noticed that the names of graduates, or students of the Michigan Agricultural College filled about one third. These young men attend the Society and work in it for the love of it; and this love comes in good part from their education and training while in that school, while the College, in turn, points to these with true Roman pride, and says: "These are my jewels." Others must get an interest by being educated and interested in a neighborhood where there are *live* horticulturists. The uneducated, or those who have not been taught to love anything of this order, will in the main, prefer other lines of work where more immediate returns are made, while others prefer to deal with animal life. Notice the young men who are the constant attendants upon the race course, and how do they compare in point of intelligence, education, etc., with our average body of young horticulturists? A chapter on Æsthetics, or on the beauty and utility of fruits and flowers would fall dead on an audience like the former, while the performance of some favorite horse would be applauded to the echo. The recruits for a Horticultural Society will not come in great numbers from such a source.

2. In our work there must be a love for experimenting. This must grow as one takes hold of the work and in progressing informs himself on the work of others, so he may work intelligently, otherwise he may be repeating the experience of some one who has preceded him. This is fully exemplified in our Patent Office at Washington, where may be found rejected models by the hundreds. Not rejected because they were not valuable, but because they were the reproduction of models already in existence, or of principles involved in others. Just so a man in the horticultural world may be constantly behind and making new discoveries, awake to find that some one has found the same and promulgated it to the world. We can not afford to repeat work already satisfactorily done.

3. Our young men must have a State pride, a local pride, and, lastly, a good wholesome pride. This must be a matter of education to some extent. The young men, nor perhaps the old men, are not found who will take hold

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and support the State Society, because they feel that our *reputation* as a State is in the balance; because our county or district is called in question! But we do feel that there should be more of this pride which should prompt us to take hold of and make our Society second to none in the west at least. To do this needs a hearty co-operation from all our workers—from all who have a pride in Indiana or in a particular district in the State. This pride, as I have already intimated, is a matter of growth. Let the old members who have this pride seek to inculcate this into the younger members, and get them to feel that it is their duty, which they owe their country, that they attend and take hold of this work. The young men need encouragement until they become interested.

I have said very little directly upon the topic of my paper, but have rather chosen to show you some of the difficulties which lie in the path of those who would interest our young men in the work now before us. Isaac Walton, in his Complete Angler, says in his cooking recipe, "First catch your fish." So I would say to you:

1. Get the young men to attend the meetings of the Society. Let every man present resolve to bring one man with him next year, and then act on his resolution, and you will all be surprised at the result. Get them to our meetings; fill our halls; invtie them to join with us in our deliberations; call them out and endeavor to interest them in the object and aims of the Society.

2. Give them something to do, and then appreciate their smallest successes and their earnest endeavors. Train them as observers; work them on the programmes; use them as judges of fruit and on committees, and when they have shown discretion and zeal, such as would warrant you in placing them in places of trust and honor, do not hesitate to do so.

Your young men will then be your pride, and your Society equal in importance and the value of the work accomplished to any in the land.

DISCUSSION.

J. C. Ratliff. I am pleased with the Prof.'s presentation of this subject. He has covered the ground well, and there remains but little for me to say. I am reminded by his suggestions that we once had a most promising young worker, who entered fully into the merits of the cause. But he was taken from us. I refer to the lamented Geo. M. Beeler. It seems to me that the field of horticulture should have its attractions for the young.

S. S. Richie. I am well pleased with the address.

W. H. Ragan. It is a lamentable fact, that we meet from year to year, but few new faces, especially those of the young. This is not only true of our society, but it is true of all similar societies. The field is a wide one. Pleasure and profit are combined here. Then why should the young stand back and leave the work to a

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few who have grown gray in the service? This fact led me in making up the programme of this meeting, to assign Prof. Ingersoll, himself a young man, the duty of opening this subject for discussion. Much may be done in this connection through personal efforts. Some months ago, a young man wrote me from Carroll county, expressing a desire to have a copy of our last year's report. An encouraging letter, resulted in his becoming a member, and to-day, another brother has also followed his good example. Following my natural taste and inclinations, I became a member of this society when young, and I believe to-day, it has done more to make me what I now am than any act of my life.

Pres. Tuttle, of Wabash College. Before speaking to the interesting subject under discussion, I desire to extend an invitation to this society to visit the college, and if desirable, hold one or more of its sessions in our chapel. Prof. Campbell will take pleasure in showing you the electric light. I need scarcely to assure you that I feel a great interest in your society. I am fond of all kinds of fruit except gooseberries. I am also much interested in the branch of the subject you are now discussing, but, then, I do not find the boys lacking in their appreciation of horticulture. Our Crawfordsville boys (I don't refer to the college students), have a high appreciation of good fruit, especially grapes and pears. This often leads them to moonlight investigations, so ardent is their inquiry after the pleasing topic. I have, at times, felt it to be my duty to remonstrate with them against this natural taste for good fruit. But, then, I believe there is a difference between a natural and a cultivated taste for fruit. While the one produces the article at home, and respects the rights of his neighbors as a natural consequence of that cultivated taste, the other, recklessly, and without discrimination, helps himself. It is the cultivated taste you would encourage. There is a story, many of you are doubtless familiar with it, in which this natural boyish appreciation of the good, resulted in the discovery of that delicious grape, the Delaware. A Dutch woman, near Delaware, Ohio, brought them to market. A boy about the store of an amateur horticulturist, in an unguarded moment, slipped some of them out of her basket. They were so good that he visited her stand the next day, and being more successful, captured more than he could devour. He hid them away about his master's store for another occasion. The master, finding the grapes, interrogated the boy as to where he obtained them. Learn-

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ing, he at once purchased the vine with all its wood, and immedidiately began its propagation and dissemination. Thus, the boy's taste directed the man's attention, and the delicious Delaware came to the knowledge of the world.

On motion of J. W. Furnas, the invitation of Dr. Tuttle's was accepted, and the society agreed to hold the evening session of tomorrow in the collége chapel.

J. W. Furnas. I think if we would talk more about trees and new fruits, it would have a better effect on the young. When I plant a tree, I desire that it shall live after I am gone, I, therefore, want a healthy tree in all particulars.

W. C. Steele. This is my first meeting with the society. I am much pleased with Prof. Ingersoll's address. I shall try to bring other young men with me next year.

Jos. Gilbert. I think Prof. Ingersoll omitted to allude to the good influence of the ladies. If they attend our meetings, the boys will, also.

Wm. Ritchy. I knew an old man that had his grapes stolen. He requested that the boys should be brought to him, so that he could sell them vines. He said they would not have them as a gift. We should encourage the boys to plant trees and vines.

On motion of Dr. T. V. Gifford, a query box was placed on the President's desk.

President Johnson followed with the reading of his address:

PRESIDENT'S ADDRESS.

Members of the Indiana Horticultural Society:

We meet to-day, in twentieth annual session, under circumstances, in some respects, more promising than have surrounded us at any former meeting. During the past year a bountiful crop of fruit, an abundant harvest, restored prosperity and general good health have prevailed. A favorable summer and autumn up to the time of the cold snap in November, had prepared the wood of trees and vines for the unusual low temperature of that time, so that apparently but little damage has been done. Some of the fruit buds of the more tender varieties may be somewhat damaged, but not to an extent to seriously diminish the crop of fruit next year.

The unmistakable signs of the times are that the citizens of our Commonwealth are taking a much more general interest in horticulture and horticultural pursuits than formerly. As some of the evidences of this I refer to the local societies formed this year, and for the greatly increased demand for our printed proceedings. It is encouraging to believe that these evidences of progress are the outgrowth of the efforts of this Society put forth for the

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last few years looking to this end, to the disseminations of a more general knowledge of the art of horticulture. There is an increasing desire on the part of the people to procure information that will enable them to grow more and better fruit. And to do this they find it is necessary to meet at the threshold, and, if possible, destroy the myriads of insects that have in the last few years not only greatly damaged their fruits and trees, but threatened their entire destruction. This leads me to speak more at length on the deterioration of our fruits caused by the depredations of insects. I have frequently alluded to this subject before, but I hope its importance will justify me again in referring to it. It is an undeniable fact that the depredations of insects upon trees and fruits are the greatest obstacles to their successful cultivation; hence, it becomes a serious question as to how these depredators can be checked or destroyed. The unscientific horticulturist may, by careful investigation and close observation, learn some things in regard to insect life that are of value to him, but after all it is to science we must turn to get such information as will enable us to successfully check these little invaders. If all insects were our enemies then their indiscriminate destruction would be our aim; but they are not. Scientists tell us that many of them are our friends, and if our people generally but knew which these are, so that we might cultivate their acquaintance and friendship, with their aid we might succeed in destroying our enemies.

To understand fully all the intricate questions of insect life, the people of our State ought and must have a State Entomologist, whose duty it would be to teach them all about insect life and direct them what to do to rid themselves of the unfriendly ones. This official might also be an ornithologist, who would teach us what birds, if any, destroy friendly insects, and what the unfriendly ones, so that we might know what birds to destroy, if any, and what to protect. Other States have these officers. Why can not Indiana, a State that is rapidly moving to the front in point of commercial, educational and benevolent enterprises? The few dollars she would pay to this or these officers would probably soon be worth many hundreds of thousands to the people of the State. Let us, then, go before our next legislature and demand protection in this direction.

PURDUE UNIVERSITY.

In a former address I had occasion to speak of this institution as one which horticulturists should support, sustain and encourage in every way possible, but at the same time intimated that practically it had not come quite up to the expectations of its horticultural friends. It gives me great pleasure to say now that the apparent defects existing at that time have since been removed and great progress made, so that the University, as now managed, is well calculated to turn out not only theoretical but practical horticulturists and agriculturists, well prepared to practice their respective arts in such a manner as will greatly benefit themselves, as well as, by example, the people generally. The different members of the faculty fill their respective positions with credit to themselves and honor to the institution. And, without desiring to make invidious distinctions, I must be allowed to say that Prof. C. L. Ingersoll, on account of his scientific attainments and

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thorough practical knowledge of the art we are met to improve, added to his disposition to conduct such experiments as enable him to arrive at enlightened conclusions on all questions of interest to the cultivator of the soil, is peculiarly well suited for the place he occupies. He certainly "fills a want long felt," and I would consider myself derelict in duty were I to dismiss this subject without first urging upon horticulturists of Indiana the importance of giving this institution all the aid, encouragement and support it so richly merits.

THE WORK YET TO DO.

I have spoken of the progress of our Society and of some of the encouragements that have attended it. But there is another picture not so bright and pleasant to contemplate, and that is the work yet unaccomplished and the difficulties encountered in attempting to do it. Our work is not done so long as we see so many farmer's homes in Indiana look so dreary and cheerless. We see their orchards with a large number of the trees originally planted destroyed through carelessness, negligence, or a want of knowledge how to prevent it. We see no small fruits which are so cheaply and easily cultivated, and so conducive to the health of the family. The garden, if worked at all, is done by the women and children, and is condensed into a very small space in order to give room to raise corn to made pork to poison the children with. Instead of the beautiful grass plat dotted over with shade and ornamental trees, with here and there a flower-bed, we see the nauseous and luxurious jimson, or the disgusting dock, surrounded with broken down fences and gates, if any, with broken hinges, piles of ashes in the dooryard that are so much needed on the garden, with many other disgusting sights. Uninviting as this picture is, it is but the photograph of too many places called farmer's homes, and plainly indicates that there is a great work to be done in this direction. These places must be made what the word "home," implies; places where all the surroundings and associations go to make life enjoyable. How can this be done? By educating the possessors of these homes in the art of horticulture. They must be taught to realize the fact that there is much real enjoyment in the work of making these homes pleasant, as well as in the possession of them after they are made so. This work it is the mission of this Society to do. It may be done in various ways, by its meetings and its discussions, by its publications, by example, by exhibitions of its fruits, flowers and vegetables; by personal efforts by its members in their respective neighborhoods, and especially by encouraging the organization of local societies. Seeing this broad field of labor, let us go forth and occupy it.

RECOMMENDATIONS.

I would respectfully recommend that the time of our annual meeting be changed to third Tuesday in November.

That a resolution be passed asking our Legislature to increase the annual appropriation to this Society $200, and that a committee be appointed to lay the matter before both Houses and urge such increase.

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That the President and Secretary to be elected at this meeting be requested to urge upon the State Printing Committee the importance to the people of the State of having a larger edition of our proceedings published, or, failing in this, to ask it to print a large edition in cheap pamphlet form of the revised fruit list, to be distributed to those expecting to plant fruit trees.

Hoping your deliberations may be productive of much good, I return to you the trust so generously bestowed one year ago.

SYLVESTER JOHNSON.

Irvington, Indiana, December 20, 1880.

On motion of W. A. Ragan, the address was referred to the Committee on Officers' Reports.

Secretary Ragan then read his report.

SECRETARY'S REPORT.

DISBURSEMENTS.

Expenses in reading proof while publishing	$9 95
Freight and express charges on books	5 40
Stationery and printing	5 71
Telegrams to Kansas Society, etc	3 63
Fitting up hall at Dublin	3 04
Extra reports for Dr. A. W. Brayton	4 50
Postage on letters, transactions and circulars	24 09
Total of expenses	$56 32
Salary	200 00
	$256 32

RECEIPTS.

Received of Treasurer on account of salary	$100 00	
Received of Treasurer on account of expenses	50 00	
		$150 00
Balance due Secretary		$106 32

I have drawn the following orders on the Treasurer during the fiscal year ending October 31, 1880:

Warrant No. 1.	J. W. Ragan, assistant at annual meeting	$10 00
Warrant No. 2.	Premium on fruits at annual meeting	38 10
Warrant No. 3.	W. H. Ragan, balance of salary for 1879	192 44
Warrant No. 4.	Mrs. H. V. Austin, expenses to Ohio meeting	22 00
Warrant No. 5.	J. C. Ratliff, expenses to Michigan meeting	6 60
Warrant No. 6.	W. A. Ragan, expenses to Illinois meeting	17 55
Warrant No. 7.	J. W. Gordon, rent of hall at Dublin	25 00
Warrant No. 8.	S. Johnson, expenses as President	10 00
Warrant No. 9.	Daniel Cox, expenses as Treasurer	5 00
Warrant No. 10.	Indianapolis Journal Co., printing and stationery	6 50

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Warrant No. 11.	S. Johnson, express charges on Florida fruit.....	$6 95
Warrant No. 12.	E. Y. Teas, expenses to Kentucky meeting.....	16 20
Warrant No. 13.	W. H. Ragan, expenses as Secretary (office).....	50 00
Warrant No. 14.	Douglass & Carlon, binding books for library.....	10 00
Warrant No. 15.	W. H. Ragan, part of salary for 1880.....	100 00
		$516 34

The above brief statement, presenting the financial transactions of the office of Secretary, including salary, will certainly commend itself to you as economical, if not wise. It is not in a sense of self-conceit, but with extreme pleasure notwithstanding, that I, at the close of my eleventh year as your Secretary, am enabled to make a financial exhibit that for economy stands first in the list of similar organizations. I find by reference to the report of the Kansas Society for 1879, that the total of expenses of the Secretary's office was $812.31; Illinois, $408.08; Michigan, $980.97 (salary alone being $600), and that the salaries of the Massachusetts Society are $2,675. I trust that you will not regard these comparisons as invidious, nor would I pretend to claim that our Society is in any particular the superior, or even the equal of those named, but I do feel that, in the light of surrounding circumstances, we are entitled to much praise for valuable work accomplished during the fifth of a century just closing, in which our work has been progressing, and I will add, steadily increasing in good results.

The labors and responsibilities of the office of Secretary have greatly increased during the last few years. We now have, thanks to the State House Commissioners and the Secretary of the Board of Agriculture, a room in the city of Indianapolis, in which we are collecting a library and museum, which involves considerable care and attention. This must be looked after by your secretary.

In collecting this library much correspondence is involved, and many exchanges are necessary, besides, many of the exchanges, and not unfrequently the most valuable, come in an unbound and comparatively useless condition. These must be properly classified and bound, and here is an additional duty; the care and attention necessary in the distribution of exchanges, that not unfrequently are received in considerable numbers from other societies, and from the Department of Agriculture, involves untold labor and responsibility, without which they may be distributed as "pearls before swine," or permitted to waste as "light under a bushel," unknown and unseen of men. Then your Secretary must have extra room, and fuel and lights, which, unless his salary justifies it, must be considered in the light of a generous donation.

Such, briefly, are the rapidly increasing duties of your secretary, not strictly clerical, to which I direct your attention at the close of my term, with the recommendation that the salary be increased by at least $50, as a matter of justice, and which the condition of our treasury will justify. I would likewise, recommend that each member of this society should use his or her individual influence in securing a liberal appropriation, through the general assembly, for the uses and purposes of the society. I believe it may be truthfully claimed, that no similar State appropriation is productive of greater good than the pittance now bestowed upon this society. The select

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list of fruits alone, prepared at the expense of great labor, and embodying the experience and practical observations of the aggregate fruit-growing talent of the State, is worth incalculably more to the tax-payers of the State, than all its careful and painstaking preparation costs them. Then let us not consider ourselves unworthy supplicants, but deserving applicants.

Very respectfully,

W. H. RAGAN, *Secretary.*

Which was followed by the report of Treasurer Cox.

TREASURER'S REPORT.

To the Indiana Horticultural Society for the Year Ending October 31, 1880.

RECEIPTS.

October 31, 1879, balance on hand	$894 26
December 18, 1879, membership fees of W. H. Ragan	70 00
December 18, 1879, of S. Johnson, State appropriation advanced	300 00
December 18, 1879, received of Calvin Fletcher for membership	4 00
Total receipts	$1,268 26

DISBURSEMENTS.

December 18, 1879, order No. 1, J. W. Ragan, Assistant Secretary	$10 00
December 18, 1879, order No. 2, exhibition of fruit on account of premiums	38 10
December 18, 1879, order No. 3, W. H. Ragan, balance of salary	192 44
December 18, 1879, order No. 4, Mrs. H. V. Austin, delegate to Ohio	22 00
December 18, 1879, order No. 5, J. C. Ratliff, delegate to Michigan society	6 60
December 18, 1879, order No. 6, W. A. Ragan, delegate to Illinois meeting	17 55
December 18, 1879, order No. 7, I. O. O. F. hall rent for annual meeting	25 00
December 18, 1879, order No. 8, Sylvester Johnson, expenses as president	10 00
December 18, 1879, order No. 9, D. Cox, expenses as treasurer	5 00
December 30, 1879, order No. 10, Indianapolis Journal Co. for printing, etc	6 50
January 10, 1880, order No. 11, Sylvester Johnson, to pay express charges of A. W. Brayton to Dublin	6 95
January 24, 1880, order No. 12, E. Y. Teas, delegate to Kentucky meeting	16 20
March 2, 1880, order No. 13, W. H. Ragan, expenses as secretary	50 00
March 23, 1880, order No. 14, Douglas & Carlon, binding books, etc	10 00
October 29, 1880, order No. 15, W. H. Ragan, part of salary for 1880	100 00
Total	$516 34
Balance on hand October 31, 1880	$751 92

DANIEL COX, Treasurer.

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The chair appointed the following committees:

ON FRUITS ON EXHIBITION.

First Committee—J. S. Beatty, of Kentucky, E. Y. Teas, Prof. C. L. Ingersoll.

Second Committee—Dr. J. A. Warder, of Ohio, J. W. Robison, of Illinois, J. C. Ratliff.

COMMITTEE ON OFFICERS' REPORTS.

W. A. Ragan, Dr. Allen Furnas, John Freeman.

COMMITTEE ON FINANCE AND ACCOUNTS.

D. E. Hoffman, John C. Maxwell Dr. R. T. Brown.

COMMITTEE ON RESOLUTIONS.

C. M. Hobbs, Joseph Gilbert, Mrs. H V. Austin.

COMMITTEE ON NEEDED LEGISLATION.

W. H. Ragan, Dr. A. Furnas, Fielding Beeler.

On motion, the Secretary's and Treasurer's reports were referred to the Committee on Finance and Accounts.

The report of S. Burnett, First Vice President, was submitted without reading.

REPORT OF S. BURNETT, FIRST VICE PRESIDENT.

To the President and Members of the Society:

Of the sixteen counties comprising the first district, extending nearly one hundred miles north and south and fifty east and west, I can only report a small portion from personal observation.

Having had charge of the fruit department of our county (Knox) society for the last ten years, I am able to give a tolerably correct statement of the condition of orchards and fruit culture here.

One of my neighbors, ten years ago, had eight thousand peach and four thousand apple trees; but the peach trees did so badly that the orchard was abandoned and the ground devoted to the raising of corn and other grains. Attempts to grow peaches have failed, so that in place of shipping to other points car loads, as formerly, our home market is largely supplied from Southern Illinois, along the line of the Vincennes and Cairo railroad.

The northern line of the peach belt seems to be gradually moving south.

Apples were abundant this year, but insects caused fully one-half to fall prematurely, and those picked for winter use have decayed badly, so that

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now our market is nearly bare of home-grown apples, and we must get our supply from the north, or go without.

We have less twig blight than formerly, but insects are largely on the increase. We have lost some trees by root rot, and others from splitting the bark, but some old trees planted sixty or seventy years ago are still in bearing. The soundest and best apples in our county are grown on what is called "white oak barrens," consisting of a stiff, hard, chocolate-colored clay, and they keep better than those grown on sandy loam and river bottoms. Fruit grown on young, thrifty trees keeps better than on old ones. I think this is not peculiar to this vicinity. In October last, I visited a portion of the lake shore fruit region, below Cleveland, where I saw, in orchards I knew forty years ago, Rhode Island Greenings badly specked at picking time, a thing unknown when the same orchards were young. Here the same variety rots on the tree, and is not even a good fall apple. If it would do any good, I would here enter my protest against planting so many varieties in any orchard, either for home use or for market purposes. Planters must find a few sorts which succeed in their vicinity and plant them, in place of planting such as they used to raise in Ohio or elsewhere. In planting my first orchard of a thousand trees, I fell into the error I would guard others against, and selected such as I used to grow on the lake shore. After that orchard began to bear fruit I saw my mistake, and planted another orchard of four hundred trees, half Winesap and half Gilpin, which is now my main dependence for winter fruit.

Pear trees still suffer from blight, dwarfs and standards alike, consequently pears are scarce. A few old seedlings planted sixty or seventy years ago still survive, and bear full crops in alternate years. I have been planting a few pear trees annually for twenty years; have cultivated some, left others in sod, planted a row directly over a drain, but all seem equally subject to the disease.

Cherries were a full crop last season, Early May being the only variety which succeeds with us, except seedling Morello. Here I wish to enter my protest against the Mahaleb as a stock for budding cherry trees. Trees budded on such stocks are short-lived and shy bearers, compared with those budded on Mazzard or Morello stocks. I have tried budding high up on the stock, as well as at the collar, with no perceptible difference.

The curculio is master of the plum, except the Wild Goose and Blue Damson, which escaped this year. After trying other sorts several years, I grubbed up my trees and gave the ground to other crops.

Grapes made the largest crop and most perfect fruit we have had for the last five years. The largest vineyard in Knox county contains eighteen acres, and yielded many tons of Ives' Seedling without rot or specks, and sold in Chicage at from three to six cents per pound, but after deducting boxes, freights and commissions, it did not pay better than a good crop of wheat.

Strawberries suffered from late frosts so that our first picking was on the 20th of May, which usually is ten or twelve days earlier and the drouth affected the late crop, so the entire crop was short of an average on sandy land, but on clay loam there was nearly a full crop. The "Wilson" stills holds the

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first place in our market, but "Champion" and "Kentucky" made a good show the last of the season. If surface rain water can be conducted into the strawberry bed even to flooding for a few hours, it will be found of great advantage both to fruit and plants. To procure the largest berries and best yield the runners must be kept off. By planting two feet each way, cultivating by hand, and keeping runners off with a knife, a next farm neighbor of mine realized one hundred dollars from a fourth of an acre.

Gooseberries did well, but coming in the same season with strawberries they were not much in demand in our market.

We are too far south to grow currants successfully, but they are not troubled with worms as they are further north.

Raspberries did remarkably well and produced a full crop. "Mammoth Cluster" is grown more than any other, but "Gregg" is being planted to a limited extent, and promises well.

Owing to the large supply of wild blackberries and low price at which they are sold, cultivated sorts are but little grown, besides the disease known as "curled leaf" has nearly destroyed the old plantations.

Report of A. Trueblood, Second Vice President.

SALEM, December 11, 1880.

Friend W. H. Ragan:

Deeming it somewhat doubtful about my being able to attend the ensuing horticultural meeting, I thought it would be safest to send at least a partial report of our district.

REPORT.

In reporting for the Second District, my personal observation is limited to about five counties of the sixteen included in the district, with some general information in regard to the greater part of the territory.

Will first speak of the peach, as it is probably of more importance to us as a market fruit in the southern border counties than any other fruit. On the high or knob lands of Washington, Jackson, Scott, Clark, Harrison and Floyd counties, the early varieties matured several days earlier than usual, ripening the latter part of June and first of July, after which we had quite a severe drouth, which continued through the ripening season of the medium and later varieties, that very materially checked their growth, many of them being entirely unfit for market. Our greatest difficulties in many of our best localities is safe, speedy and careful transportation of our product to a northern market.

The Hale's Early, which has heretofore invariably rotted badly on the trees, this year did splendidly, bearing profusely and ripening well. The later varieties, many of them, were dried up on the trees from the excessive heat and drouth.

Many of our trees on low ground were killed by the cold two years ago, and we seriously fear that most of the buds and many of the trees are injured by the severe cold this winter—have had 18 degrees below zero.

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APPLES

Were a full crop, but owing to warm, dry weather spoken of in last article, they ripened prematurely; many of them rotted before they found winter quarters, but what are left are keeping well. Rome Beauty, Ben. Davis, Winesap and Smith's Cider are among our best winter varieties. The Winesap is thought the best keeper we have.

STRAWBERRIES.

Strawberries, raspberries, gooseberries and currants were a fair crop of superior fruit; are not troubled here much with the currant worm.

The crop of blackberries (wild) was the most abundant probably ever known—more than folks, birds, hogs and all could "get away with."

MISCELLANEOUS BUSINESS.

J. W. Furnas presented a specimen of the Jones apple, from Morgan county. It is a fine looking apple, and recommended as promising well where best known. It originated in Washington county, Indiana. (See description elsewhere). Dr. A. Furnas called attention to a specimen of the celebrated Salome apple, from Ottawa, Illinois; also, the Wilkinson pear.

E. Y. Teas spoke of the Henrietta peach, and read the following extract from the Farmers' Home Journal concerning it:

I this day send you by express a basket of my seedling peach, "Henrietta." Please examine it and report on its quality. I also inclose a twig with the leaves, that you may determine its glands. I will state that I began gathering and shipping the peaches on the 20th of September, and from seventeen trees planted four years, and thirty planted three years, both of which plantings bore full crops, and from twenty-five trees three years old, that only had a few scattering specimens, I have gathered two hundred and five baskets of choice peaches. Many of them were sold at $1.25 per basket. My trees are twenty by twenty feet apart, making one hundred and nine trees per acre. So you see I only have two-thirds of an acre set, and less than one-half acre that was productive, for which I have sold two hundred and five baskets. Gross sales, $208.55; freights and commission, $25.95; net $182.60—a very satisfactory yield for forty-seven bearing and twenty-five partially bearing trees of the "Henrietta" peach. J. S. BEATTY.

J. S. Beatty, of Kentucky. The peach did not originate with me. I regard it as one of our most valuable late varieties.

J. W. Robison, ex-president of the Illinois Society, was introduced, thanking the society for courtesies shown him, after which, on motion, adjourned to 7 o'clock P. M.

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EVENING SESSION.

On reassembling at 7:30 o'clock, the Society was greeted with the strains of delightful music by the city band, after which President Johnson resumed the chair.

Prof. John M. Coulter, of Wabash College, then addressed the Society on the

RELATIONS OF THE SCIENTIFIC TO THE PRACTICAL IN BOTANY.

Mr. President, Ladies and Gentlemen of the Indiana Horticultural Society:

When your worthy Secretary wrote, asking me to deliver an address upon this occasion, he very carefully underscored the word *written*. Now I am not in the habit of writing my lectures on botanical subjects, and was rather taken aback, but in an evil moment for you, consented. Sitting here to-day I have been wondering what in the world I have to do with a meeting like this, much less presume to address it; I who can not tell one kind of an apple from another, excepting as was said this morning, the kinds our fathers planted; who never planted a garden, except to have it overgrown with weeds; who never set out a tree or spliced a graft—what have I in common with these practical horticulturists? So far as botony goes, my life has been quite an eventful one. First, as a collector in government employ, ranging over our whole country from ocean to ocean; then as a teacher; of late years a botanical editor and investigator, my experience has been varied enough, but in it all I can find no practical horticulture. Absorbed as I am with plant life and structure, as seen through my compound microscopes; experimenting as I am constantly upon plant movements; upon cross fertilization by insects, by birds, by winds, upon the thousand activities so minute, yet so important; searching as I am always among those mysteries of life that have not yet been revealed to us, of what use can I be to you who deal not with theories, but with facts; before whose calm but heartless query, "Of what *benefit* is that to us? so many theories have tottered and fallen.

In these latter days, however, we have come closer together, and the subject assigned to me to-night has to do with our common meeting ground, and I shall attempt to give a very brief answer to the question I have raised: Of what use can we closet investigators be to you practical men?

ADDRESS BEFORE THE ANNUAL MEETING OF THE INDIANA HORTICULTURAL SOCIETY, CRAWFORDSVILLE, IND., DECEMBER 21, 1880.

Relation of the Scientific to the Practical in Botany.—It is hardly necessary in this presence to speak of the intimate connection existing between science and practice in general, for we are all believers in science and science applied. I conceive it to be my duty to give some illustrations of the dependence of practical botany, or horticulture, upon what may be called purely scientific botany. There was a time, not so very long ago, when scientific horticulture

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was sneered at, when it was seriously thought that doing a thing blindly, in total ignorance of the relation existing between cause and effect, was better than doing it intelligently, understanding perfectly the whys and the wherefores of every process. Your presence here to-night is a proof that this sentiment no longer prevails; that instead of following along in the well worn paths of previous generations, you are striving to break paths through new ground that shall lead more speedily to the desired object, or to entirely new fields of investigation. The result is that scientific horticulture has already banished many fanciful notions into the limbo of a superstitious past and has given new ideas which, to-day, are most prolific in results and promise still greater things for the future. But how the old superstitions hang around us still! "Potatoes must be planted in the light or dark of the moon," says an old fancy, but no one has decided which it should be, and this important matter is left to individual opinions. And to-day your shrewd farmer, forward, progressive in all his ideas, often quietly sees that the moon is right before planting, but ready enough to deny that he has any shadow of a belief that the position of a distant satelite can blast or perfect his crop.

There are a good many ways in which botany may be studied. We may study plants simply to find out their names, a branch of the study which has very little practical application. We may study a plant in its make-up, its structure, a study only practical in so far as it explains some other branch. Then, last and highest, we may study the plant as a living organism, full of all the activities of life, moving, breathing, digesting, growing, reproducing; having its diseases and their cure, its laws of health leading to most perfect development. Of this branch of botanical study, physiological botany, as it is called, we can hardly overstate the practical applications.

I notice that one very important contribution of scientific botany to horticulture is to be presented later in the programme, and when you hear Prof. Burrill's description of the insidious attacks of unseen foes upon some of the objects of our greatest care, please remember that it is only one illustration of the subject under discussion this evening. Leaving therefore parasitic fungi for to-morrow night, I will deal with some of the practical results of our studies among the higher plants. I shall very hastily speak of three things, viz: The study of "Fertilization and the production of Hybrids," the study of the "Effect of External Influences upon Plant Growth;" the practical results of recent experiments upon the "effect of uninterrupted sunlight and electric light upon the growth of plants."

I. It has long been known that before a plant can set seed it must be fertilized, that is, there must be a transfer of the pollen of the stamen to the pistil, which contains the bodies to become seeds. Two methods are recognized, viz: Close and cross fertilization and the difference is a very simple one. In close fertilization the pollen is applied to the pistil of its own flower. In cross fertilization the pollen is applied to the pistil of some other flower, either upon the same plant, or preferably upon some other plant. Cross-fertilization is the plan adopted by nature, but close-fertilization is sometimes effected. "Get fertilized," is the prime rule of nature, "cross-fertilized if possible; close-fertilized if necessary." Strange enough, it suits us better as horticulturists to reverse this rule of nature, for close-fertilization is our rule,

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cross-fertilization the exception. The latter is too much like a double edged tool that we are very little acquainted with; it may cut where we desire, but is more apt to cut anywhere else.

Why, then, does Nature adopt one method, and we the other? Simply because we are not content to have our vegetables and fruits as Nature gives them to us. Look at the small, sour, seedy grape of Nature, and the large, sweet, luscious grape of horticulture; compare the diminutive tubers clinging to the thin soil of the Andes, no larger than peanuts, with the large, starch-filled potato of our gardens, and you have in object lesson the different effects of cross and close fertilization. Why, then, it may be asked, does not Nature, that beneficent mother, adopt our methods and better the condition of her offspring? Nature does what is best for her offspring, while we make of the offspring what is best for us; hence our objects differ, and necessarily our methods. Suppose there has sprung up in some species a tendency to vary (and all variation originates from the seed); cross-fertilization comes in and checks that tendency and crushes out the incipient variation. In other words, it holds plants true to their specific characters, and if there is any such thing as fixity of species, cross-fertilization is the chief agent of it, continually struggling against tendencies which are inherent and unexplainable. But it is this very tendency to variation that we wish to encourage, and, therefore, we use close-fertilization, which always transmits and intensifies variation. Take the case of the wild potato. Under changed surroundings the tendency to vary was in the direction of larger tubers. Selecting the plants with largest tubers and close-fertilizing them, the resulting seeds would produce still larger tubers, and so this intensifying of the variation would go on until it has reached its natural limit, often in the destruction of the variety; it "runs out," we say. The objects of close-fertilization can be accomplished in another way, generally less risky and saving of time. We can use the organs of vegetation for propagation, with an absolute confidence that they will transmit every character of the parent stock. Instead of seeds, therefore, we plant roots, tubers, joints of the stem, even leaves, and the resulting plant, without fail, will come true. Thus it is we avoid all danger of cross-fertilization and the tendency to revert to the original unimproved state. You can plant the tubers of all the varieties of potato you please in the same patch, and there will be no mixing. But if you should plant the seeds from that patch, the resulting tubers would probably differ from any one that you had planted.

In the case of annuals and biennials, we are bound up to close fertilization and propagation by seed. To our aid there comes this fact: if close fertilization is kept up for several generations, the seeds will gradually lose any tendency to revert, and we can depend upon their coming true. Such is the case with our well known varieties of Indian corn, cabbage, lettuce, raddishes, peas, etc. This has been accomplished, sometimes, by centuries of domestication in the case of nearly all our garden varieties of annual and biennial esculent plants, and there is no reason to doubt that the same thing will be accomplished with our perennials, even trees. The success which has attended the cultivation of seedling peaches is a strong argument in favor of the idea that we can get heritable varieties among our other trees. The

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cycle of the apple or pear is longer than that of the peach, and hence the formation of races, that is, varieties capable of propagation by seed, will be a matter of more time.

True hybrids are formed by the crossing of distinct but nearly allied species. In the animal kingdom all the common hybrids are sterile, but this does not hold good in the vegetable kingdom, and to this fact we owe some of our finest varieties among vegetables, flowers and foliage plants. Hybridization is exceedingly injurious to the plant, but very useful to us. For instance, it results in greater vigor, larger and more showy leaves, larger and more brilliant flowers, more fragrance, more copious secretion of nectar, and these are the very points we wish cultivated, but they are the infallible signs of diminished fertility, that the plant is in danger in its most vital functions, that of reproduction.

Hybridization then invigorates vegetative organs, but enfeebles reproductive organs. As we can propagate by slips, cuttings, bulbs, etc., we care nothing for a diminished or even destroyed power of setting seed, if we only get a more vigorous vegetation. It may be a question with some why invigoratad vegetation accompanies diminished fertility. The reason is a simple one. The lack of fertility is a most dangerous variation in the plant and will result in its annihilation unless checked. The sovereign remedy for this is cross fertilization, and the plant must secure it. The chief agents of this pollen transfer are insects, and, hence, whatever the plant can do to attract them will help it in securing cross-fertilization. They are attracted by color or fragrance, knowing that these mean nectar. Increase color, fragrance, nectar and the chances of insect visits are increased. This is exactly what the hybrid is doing. Making nectar and fragrance is a very exhaustive process, and, hence, their increase necessitates increase in the organs of assimilation, that is, the leaves. Diminished fertility, then, must display a more glaring advertisement. We care for the advertisement, and care little for what it tells. This result has been repeatedly brought about among the lily. Two insignificant lilies when crossed may produce a magnificent hybrid, or they may produce nothing worth cultivating. Just here is one of the most prolific sources of the new varieties continually made by horticulturists. If a hybrid does set seed and that seed is planted, what the resulting plant will be no man can pretend to guess. The chances are that it will produce something never seen before. A hybrid in its descendants is cut loose and adrift, and no one can tell where it will bring up. We sieze hold of some descendant that suits our fancy and nurse it, intensifying its peculiarities and fixing its characters until we have a new variety ready for the market. If a hybrid is sterile it generally results from a failure of the stamens to produce pollen. If, now, pollen be taken from either parent and the sterile hybrid fertilized, it will set seed, but the progeny will be very apt to resemble, not the hybrid, but that parent of the hybrid from which the fertilizing pollen was taken. So it is, that by various contrivances we can manipulate these varieties and hybrids and produce endless modifications, many of which may be of great use to us. Think not that we produce variation; we simply furnish these conditions under which variation is most likely to occur, and if it does occur we select such forms as suit our fancy and fix

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them. No more practical result from scientific investigation can be shown anywhere than in the constant production of new forms resulting from experimental study of the subject of close and cross fertilization and hybridization.

II. Effect of External Influences upon the Work of Plants. This comes to us as a question of very great importance, for while we are helpless in regard to the innate tendencies of plants, while we can not change a rose into a pink, we can have some control over external influences. If, therefore, we discover what relation certain external influences sustain to the growth of plants, we have discovered some means of regulating plant growth. Many kinds of work are being done by living plants, all of which are to some extent dependent upon surroundings. First, there is the work of assimilation, that is, taking the food absorbed from the air and carried up from the roots, and changing it into plant material. This work can be done anywhere in the plant where there is green tissue. Wherever green color is found in plants, there this work of turning crude sap into elaborate sap is going on. Of course most green tissue is found in the leaves, which are nothing but contrivances for exposing the greatest possible amount of green surface. What is this green in which seems lodged the power of assimilation? If you look into certain of the plant cells, you will find them containing little green masses, usually round, and called granules of leaf green. We have here put finger upon the great agent of assimilation, the thing that does a work we can not imitate in our laboratories. And what is this plant laboratory? Simply a little soft mass of green jelly, that you must magnify hundreds of times to see. These granules of leaf green are found, not in all cells, but only in those at the surfaces of plants. Cut into any plant, anywhere, and as a rule you will find no green beneath the surface. Hence no work of assimilation is going on except at the surfaces of plants. What, then, are the conditions necessary for this leaf-green to act? One great condition is sunlight. This laboratory refuses to work the moment sunlight is withdrawn, hence in darkness the work of assimilation must stop. But assimilation supplies the call for food from growing parts, hence, unless reserve material has been laid up, growth must stop; growth must be going on and excess of food supplied before food can be stored up in tubers, bulbs, etc.; hence storing up of food must stop. It follows that with withdrawal of light comes a suspension of all the activities of the plant that depend on assimilation. In my third topic, I will take up the subject as to how this cessation from work may be avoided. Leaf green is dependent for its very existence upon sunlight; for keep a plant in the dark any length of time and it becomes bleached—the green is destroyed. The blanching of celery and a hundred other common phenomena depend upon this fact. Too great light has the same effect as too little light. You can as readily blanch celery under brilliant light as in darkness. Of course the latter method will always be used, because it is of infinitely easier appliance. Light thus "blows hot and cold" upon these sensitive granules. Their existence depends upon one other thing that we can regulate, namely, the presence of *iron* in the plant food. You can easily demonstrate the importance of iron in giving a

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green color to plants, by growing young plants of Indian corn in solutions containing no iron. The first formed leaves are green, but afterwards only colorless ones will be produced. Add some soluble salt of iron to the solution, and the colorless leaves become green in a few days. These two conditions seem to be necessary, then, for the work of assimilation to go on at all, viz., *sunlight*, not too much or too little, and *iron*.

Another question then rises to be answered experimentally. We know that the white light of the sun is but a blending of seven colors. Thrown through a prism we have these colors separated, appearing as different bands. At one end is red, at the other blue and violet, and in the middle comes the yellow. Beyond the violet end is darkness, but in that darkness lies the region of greatest chemical activity. Beyond the red is also darkness, but in that darkness is the region of greatest heat. Let these different bands of color be thrown along a table and it will be a very simple thing to put pots of quick growing plants in each one and see the work that is done. The work of assimilation that we have been speaking of is sometimes called chemical work. If so we would expect to find assimilation most active at the violet and blue end and just beyond; but we find that there assimilation is entirely checked as much so as if the planet was placed in total darkness. Plainly, then, it is not a chemical action. When photographers wish to prevent chemical changes upon their sensitive plates, they must go into a dark room and admit as the only light—what color? Always yellow.

In other words, yellow, the most luminous band of the spectrum, is chemical darkness. We find, however, in the case of our growing plant that of all the colors of the spectrum *yellow* is the most favorable for assimilation. "Chemical darkness is botanical light." It may be asked, are we to infer from this that we had better cultivate everything under a yellow light, and let a yellow glass fever replace the absurd blue glass craze of a few years ago? If assimilation was the only work of the plant, I would say most emphatically cultivate everything in yellow light. But there is another important work done by the plant that would be just about stopped by such a proceeding, viz: the *use* of the food provided by assimiliation as manifested in growth and storing up of nourishment; in other words, you would stop *growth*. Your plants would make an abundance of food, but they could not use it readily. Plants use the food provided by assimilation just as we do, viz: they consume it, burn it up, oxidize it, in order to keep up the plant activities, and if more food is provided than is necessary for this purpose they store it up in the form of starch; animal bodies store it in the form of fat. This consumption of food is a chemical process, and of course will go on most actively in the blue and violet end of the spectrum and in the darkness just beyond. So in the plant this work is done in the deeper parts, away from the surface, and it is found that darkness is most favorable to growth. To our yellow glass we would now have to add blue and violet.

But another work done by the plant is the work of reproduction, that is, providing seeds for the propagation of its species. This is done best in the red band of the spectrum, and in the heat beyond. So we could go through all the work of plants, until we will have to come to the conclusion that we can not confine ourselves to any color or colors, but we must have all colors

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blended, that is, white light. And we have come to the conclusion at last that the Creator was about right when he gave white light to plants.

But the facts presented here contain many suggestions that may have a bearing upon certain conditions of plants at present hard to manage. Plants may have their digestive apparatus impaired—a sort of plant dyspepsia, shown in a pallor that any one acquainted with the plant would recognize. Iron may cure it; more or less light may cure it; the periodical appliance of yellow light may enable the plant to continue assimilation without its cure. If the plant is not growing with sufficient vigor, or storing up nourishment that is desired, although plenty of food is supplied and the leaves seem to be doing their full duty, the deepening of the darkness around roots and tubers, or the application of violet light or the chemically active rays to the stem or growing shoots and buds, may invigorate growth and hasten the storing up of food. The perfection of arrangement would be to have all assimilative parts in yellow light and growing parts in darkness; but this, so far as I can see, is impracticable; for very often these two operations are going on in the same cells. I do not mean to say that the results will necessarily follow exactly as I have indicated, but such seems to be the direction in which this scientific investigation of the plant work in relation to surroundings will have to be applied.

III. In conclusion, let us consider some late experiments upon the influence of light upon plants, experiments that are likely to result in great practical benefit to horticulturists, and even revolutionize our greenhouse methods. We have seen that certain activities of the plant are carried on best in the sunlight. With its withdrawal comes a suspension of assimilation and all the activities that depend upon it. More than that, the building of the day is not only checked by darkness, but partially torn down. Hence, growth of plants represents the difference between the day's work and the night's destruction—the excess of the food made over the food used up. All our vast coal beds are but the measure of this excess in the coal period. The question then presents itself for experimental answer.

Suppose the conditions of night are entirely withdrawn, shall we lessen the loss of assimilated material and thus hasten and invigorate growth? It has been a generally received opinion that plants need the darkness of the twenty-four hours for rest, and if deprived of it, will really do their work more feebly, and hence check growth rather than increase it. This subject was taken up experimentally by Dr. Schübeler, of Christiana, more than thirty years ago, and he has in that time most patiently accumulated the facts, which have been very recently published in a Norwegian scientific journal. Dr. Schübeler was very favorably situated for conducting such experiments, for he had the almost uninterrupted sunlight of Northern Scandinavia. His first experiments were with wheat. Samples from Ohio were planted, and the very first crop showed an increase in size and weight of grain, together with deepened color. Common garden flowers of Central Europe, when raised in Norway, take on a richer color; for instance, changing from pale blue to deep blue, from white to pink, etc. The aroma of fruits and vegetables was also much increased. Some of the most savory of European garden vegetables, when grown in Norway, became absolutely dis-

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agreeable to the taste. While aroma is dependent upon light, sweetness is dependent upon *heat*. Given then continuous light, but at the expense of heat, while aroma is increased, sweetness is diminished. The effect of interrupted sunlight upon plants may be summed up thus: First, it *increases aroma*, and hence suggests what ought to become a profitable industry in high northern countries, viz: the cultivation of those plants which are valuable for their yield of fixed and essential oils, since the per cent. obtainable from a given weight is much increased by growth under these peculiar conditions. Second, if uninterrupted light is gained at the loss of heat, sweetness is diminished, and hence by the move northward small fruits, such as strawberries, plums, cherries, etc., become very much more acid. Dr. Schübeler's experiments seem to imply that plants do not need any rest during the twenty-four hours, and hence if we can furnish the conditions of sunlight continuously, we may expect continuous growth and a rapid development, compared with which our present forcing processes amount to very little.

As we do not possess the power of old Joshua, we can not furnish uninterrupted sunlight in ordinary latitudes, and hence must use some substitute. The artificial light which most resembles sunlight in all of its properties, is electric light, and with this Dr. Siemans is now experimenting. Some of his results he has given us and they confirm in every particular the deduction of Dr. Schübeler on the effect of the uninterrupted sunlight of the Arctic region. Of course the question first presented to Dr. Siemans was, whether artificial light would enable the plant to do the work of assimilation. He used a large electrical machine of his own invention, driven by an engine of three-horse power, and producing a light equal to 1,400 candles. In the first series of experiments the lamp, with metalic reflector, was placed in the open air six feet above the glass of a sunken melon house. Pots of quick growing plants were used, such as carrots, beans, cucumbers, etc., and were so arranged that the light would fall on them at nearly the same angle as that of the sun. The pots were divided into four groups; some being kept entirely in the dark; others exposed to electric light only; others to daylight only; others to day and electric light successively. The electric light was applied only from 5 P. M. to 11 P. M., the plants being left in darkness the rest of the night. The result showed that of all the plants, those exposed to sun and electric light alternately were by far the most vigorous, much more so, than those growing in the ordinary conditions of sunlight and darkness. This established as a fact that electric light can do the work of sunlight in plants.

Dr. Siemans' next experiments were to see whether the plants needed any rest during the twenty-four hours. Accordingly he subjected growing plants to eleven hours of sunlight and eleven hours of electric light. The result was even much more striking than before, for the plants subjected to this treatment were stronger, more vigorous, deeper in color, more fragrant than under any other conditions. To sum up the conclusions deduced from Dr. Siemens' experiments thus far we find:—

1. Electric light can promote the growth of plants.

2. An electric center of light equal to 1,400 candles, placed at a distance of six or ten feet from growing plants, appears to be equal in effect to average daylight.

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3. Plants do not require a period of rest during the twenty-four hours of the day, but make increased and vigorous progress if subjected during daytime to sunlight and during the night to electric light.

4. The radiation of heat from powerful electric arcs can be made available to counteract the effect of night frosts.

The expense of electro-horticulture will depend upon the cost of the mechanical energy necessary, and when natural forces can be used, such cost can be reduced to a minimum. I have very little doubt but that in the near future, electric light will seem to be as necessary to green house operations as a supply of water is now. There will be more difference in the rate of plant growth in green houses with and without electric light than there is now in plant growth with and without green houses.

I have mentioned but very few instances of the way in which the study of scientific botany is working for the aid of horticulture, and even if this was all, the debt would be a very large one, for when we can produce new varieties at pleasure, possessing just such characters as we desire; when we can stimulate or check the plant in the performance of any of its functions; when we can make artificial light do the work of sunlight, and thus counteract the destruction carried on in darkness, making plants machines of ceaseless activity, then it is that horticulture will attain its highest achievements, because based upon scientific principles, deduced from experiments conducted in the study of scientific botany.

DISCUSSION.

Dr. R. T. Brown. A prejudice, but recently strongly rooted, is fast giving way. The idea of an educated farmer, one who could read and think for himself—a book farmer—was hooted at long since the beginning of the present century. Then botany was an unknown science to the farmers, many of whom believed that wheat would, under certain treatment, turn to cheat; that weeds were the spontaneous production of the soil, a kind of a curse placed in the way of man, and that to succeed in farming and gardening, it was necessary to cultivate an intimate acquaintance with the moon, and her particular phases. Now I am a good friend of the moon, but I think old Saul has more to do with our farming operations than the moon has. A knowledge of botany dispells such darkness. It defines and explains the genera and species of plant life, and enables us to know just how far hybridization may be carried. It enables us to classify our plants, and proves the utter fallacy of the spontaneous growth of weeds, or the change of one species, as wheat, into another.

Dr. J. A. Warder. I have been very much instructed this evening. I am glad to see my pet Hoosier Society getting down to such good work. In Illinois they have a botanist, who is one

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of their valuable officers. Why not have one in Indiana and Ohio? The address of Professor Coulter has been highly interesting to me.

Prof. Ingersoll. The subject of the Prof.'s address is one near to my heart. The influence of light upon plant life of great importance, especially to green house men. A commission of eminent scientists have been experimenting in England with colored glass for green houses. Thus far, they agree that a light green shade is best.

Dr. Warder. It has been said that fungi does not attack healthy plants. Prof. Burrill, of Illinois, is studying this subject. He is succeeding in innoculating healthy plants with the virus, but not without placing it fairly in the circulation of the living tissues. He invariably fails where it is merely applied to the surface. His investigations may lead to important results concerning the pear blight.

Secretary Ragan suggested as Prof. Burrill would present this subject to the Society on to-morrow evening, he would divert the discussion and present a singular specimen in which the usual course of nature had been greatly interfered with The subject is a *Scotch pine tree,* which has been completely girdled for years, but still lives. Can Prof. Coulter or other scientist who may be present, explain the cause of this singular freak of nature?

Prof. Coulter. This is a very singular specimen. It fully exemplifies the truth of science. The sap is carried to the branches through the pores of the wood, it is returned beneath the bark. In this specimen the bark has been removed. This has arrested the downward flow of sap, while the roots have been kept alive by branches that put out below this point.

C. M. Hobbs. Is the girdled part dead?

Dr. Brown. The inner wood is alive, but the surface is certainly dead.

Dr. Warder. Trees that have been girdled sometimes have the bark renewed, but there is no renewal of bark in this case. Young trees, with a large amount of sap wood, live longer after being girdled than older trees with less alburnum. This is an interesting specimen, and should be carefully preserved.

NOTE.—The specimen will be preserved in the Museum of the Society at Indianapolis.—*Secretary.*

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Prof. Coulter, by request, then read the report of Mrs. Louise V. Boyd, as delegate to the late meeting of the Ohio Society.

REPORT OF OHIO MEETING.

The fourteenth annual meeting of the State Horticultural Society of Ohio met at the Board of Trade room, City Hall, Columbus, the 8th, 9th and 10th of December, 1880.

The first forenoon was occupied in arranging the display of fruits and transacting the preliminary business.

In the afternoon Colonel G. S. Lunes delivered an exceedingly excellent address of welcome, to which Dr. Warder responded in a few brief and happy words, after which followed his annual address. Tender and kindly allusions were made to the deceased Secretary, Mr. Bateham.

At the evening session reports of local societies were read, and also a short report given by the Indiana delegate, after which came a fine paper on Landscape Gardening, by Mr. Pierce, of Summit County. An interesting discussion followed. One would plant for the present, another for the future, but always *beauty* was the object striven for, however much individual tastes might differ.

The second day a paper by Mr. Newton, on Gathering, Keeping and Marketing Apples, brought out various opinions and experiences from eminent fruit-growers present. Strangely enough, the common method of arranging apples for winter use in shelves or shallow bins was condemned, and the theory that an apple preserved an apple stoutly contended for. Another arrangement was highly recommended to pack apples in boxes holding a bushel, by which means they would be ready to send to market, and much handling saved. While this earnest and instructive discussion showed a unity of interest, it certainly did not show a uniformity of experience, and there was much good-natured difference of opinion. There were also papers on the Evaporation of Fruits, as connected with horticulture, by Mr. Edgerton, one of extraordinary beauty and merit by G. W. Campbell on the Forming of New Varieties of Fruits, and so assisting nature to perfect herself, and one on Rural Cemeteries, by Dr. Warder, containing many very fine points. To say this paper was as well received as it was *well read* is saying much for it.

The Society met early in the evening to listen to their most distinguished visitor, Charles V. Riley, the entomologist, now of Washington, D. C., who has represented the State of Missouri in the United States Government for the past five years.

Mr. Riley is a young man of modest deportment, and in his style of speaking straight-forward and practical. With the assistance of charts representing such *little monsters* as cruel curculios, abominable borers and wicked weevils in unpleasant variety, the professor gave us a pleasant and profitable talk. He was kind enough to give plant growers the benefit of a recent discovery of his own, viz: how to dilute oil in a way that it may be sprinkled upon vegetation to destroy insect life. First, pour the oil (kerosene is most convenient) into milk, after which it will readily combine with water and may be applied with a syrine or sprinkler.

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After this first lecture of Mr. Riley the society proceeded in a body to the State House, where, in the Board of Agriculture rooms, a banquet had been prepared by the ladies of the Columbus Society. Here, too, were many citizens, including State officials and officers of the United States courts. The occasion was in reality a "social." The banquet included both substantials and delicacies, while the floral decorations were elegant and tasteful almost beyond description—indeed your delegate refrains from penning this in detail out of regard for that part of the *perfect prayer* containing the words "Lead us not into temptation," the *temptation* of *envying*.

On Friday morning Mr. Riley continued his talk on insects, devoting most of his time to the pestiferous phyloxera vitifolia.

> **"And still we heard and still the wonder grew**
> **That one small head could carry all he knew!"**

Why he knew more about those microscopic insects, the rascally robbers of the life-blood of the grape-vine, more about the mystery of their obscure family habits than we do about the family habits of our grandmothers.

This lecture, and the discussion that followed, was listened to and participated in with the most lively interest. A short discussion on small fruits followed, and then came the "finally" in the shape of resolutions. Two of the most general interest I give below—one to memorialize the Legislature, asking for liberal appropriations for the State University and the establishment of a chair of horticulture therein; the other asking that the National Commissioner of Agriculture under the new regime be chosen from the great agricultural region of the West, and that he shall be a practical business man, as well as one both scientifically and practically acquainted with agriculture and horticulture.

Lastly, I will say the display of fruit was very fine. The visitor looked with wondering delight on the superior richness of the coloring of Buckeye apples, all the old favorite varieties being represented and several new ones added. There were some very fine late pears, and Mr. Woodward, of New York, had on exhibition two plates of Niagara grapes of fine quality, plucked September 16.

So we take leave of Ohio, the proud mother of modern Presidents and other great products.

DUBLIN, IND., 12, 17, '80. LOUISE V. BOYD.

Dr. Warder. Mrs. Boyd has furnished you an excellent report of our meeting.

Prof. Riley more than repaid us in the outlay we made in securing his attendance at our meeting, in one item of information. He told us how to mix kerosene, first with a small quantity of milk, and then with water, to any desired strength. It can thus be safely used as an insecticide.

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KEEPING APPLES.

Wm. Ritchey. I keep my apples packed in thrashed oats. I have found no plan to succeed so well. Has any one tried this method?

Dr. Warder The plan will do so long as the oats remain free from deleterious odors. They will spoil the flavor of the apples if not perfectly sweet and free from must.

On motion, the Society adjourned to meet at 9 A. M. to-morrow.

SECOND DAY.

MORNING SESSION.

At 9 o'clock A. M. President Johnson resumed the chair, stating as he did so, that we would now hear from our representative on the Board of Trustees of Purdue University, the Hon. J. C. Ratliff.

REPORT OF J. C. RATLIFF, TRUSTEE OF PURDUE UNIVERSITY.

To the Indiana Horticultural Society:

As an evidence of the increased prosperity of Purdue University, I take pleasure in reporting that there are now, at the end of the first term of the present college year, 203 students, a number equal to that of any entire year in the history of the institution, and from information now in the hands of the President the number will, in all probability, be increased from thirty-five to forty during the coming two terms. The increase of students since President White took charge of the University, in 1876, has been at the rate of 150 per cent., on an average, each year, and 600 per cent. of the number in attendance when he entered upon his duties as President.

The University farm is still under the management of a committee of the Board of Trustees, and notwithstanding the unfavorable season for most of the farm crops, the result is very creditable. The balance sheet shows the total amount of receipts above the expenditures to be $776.69. The design of the committee is to make it a self-sustaining, model farm.

The horticultural department has also been successful beyond my expectations. The adornment of the campus and grounds about the buildings were made more complete and attractive the past season than ever before. The greenhouse is now full, the room being all occupied by as fine, healthy and vigorous plants as I ever saw. Although the greenhouse is not to be considered as a means for making money, yet the sale of plants to visitors and others during the year now closing amounted to $250. This is a much better showing than I expected, considering the small number of plants we had to begin with. The management of this department is still in charge of George

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Vestal, who has proved his competency for every part of the work intrusted to his care. I now wish to call the attention of the society to a few of the many experiments made in agriculture during the past year. As stated in my last report, ten acres of ground was set apart for experiments with field crops, under the supervision of the professor of agriculture. For the first experiment with wheat, the ground (a stiff sod), was prepared by plowing 6½ inches deep; harrowed twice and rolled. It was then laid off or divided into plats, five rods by thirty-two rods, each containing one acre and numbered. One and three-quarter acres was drilled with Fultz wheat at the rate of 1 1-7 bushels to the acre, on the 22d of September. This was for the purpose of establishing the basis of a yield under favorable circumstances with *fertilizers*. The remaining one quarter acre was sown with *different* varieties with a view of testing their comparative *productiveness* under similar circumstances. The wheat was all put in with a drill on the same day. The varieties sown on the quarter acre are as follows:

No. 1. Jennings White Wheat.
" 2. Kentucky White.
" 3. Post.
" 4. Shaffer.
" 5. White Rose.
" 6. Powers.
" 7. Michigan Wick.
" 8. Silver Chaff.
" 9. Treadwell.
" 10. Buckeye.
" 11. Diehl.
" 12. Velvet Chaff.
" 13. Louisiana.
" 14. Armstrong.
" 15. Golden Straw.
No. 16. Tappahannock.
" 17. Trump.
" 18. Rough Chaff.
" 19. Victoria.
" 20. Russian White.
" 21. Dott.
" 22. Fultz.
" 23. Russian Red.
" 24 Laurens.
" 25. Arnold's Hybrid.
" 26. Nursery.
" 27. Red May.
" 28. Lancaster.
" 29. Mediterranean.
" 30. Amber.
" 31. Muskingum.

Of the white varieties Nos. 1, 2, 4, 7, 8, 12 and 14 did well.
Of the red varieties Nos. 22, 23, 25, 28 and 29 did well.
The amber did the best of all the varieties compared.
Nos. 1, 12, 22, 23, 28 and 30 did about equally well. Those last named will be tried another year.

The 1¾ acres of Fultz wheat referred to for experiments with fertilizers were subdivided into plats, five rods long and one rod wide, or 1-32 part of an acre each. These plats were designated by letters, and the following kinds and quantity of fertilizers were used:

On plat A, 320 pounds of salt was sown.
On plat B, 320 pounds of bone meal was sown.
On plat C, 480 pounds of guano was sown.
On plat D, 480 pounds of blood and bone meal was sown.
On plat E, 160 pounds of gypsum or plaster was sown.
On plat F, nothing.

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Fertilizers were sown on each alternate plat of general division. The wheat was harvested on the 22d and 23d of June. The yields were separately weighed in the straw and the wheat carefully weighed after thrashing. The difference between the weights was assumed to be the weight of the straw. The following is the difference between the fertilized and unfertilized plats:

YIELD PER ACRE.

	Plat.	Fertilized. Bushels.	Unfertilized. Bushels.
Salt	A	22.61	25.33
Bone meal	B	25.41	23.54
Guano	C	27.25	24.42
Blood and bone	D	26.78	23.49
Gypsum	E	24.60	24.59

The general average of results is as follows:

Salt produced a loss equal to 2.72 bushels per acre.

Bone meal produced a gain equal to 1.87 bushels per acre.

Guano produced a gain equal to 2.83 bushels per acre.

Blood and bone produced a gain equal to 3.29 bushels per acre.

Gypsum produced a gain equal to .00 3 bushels per acre.

The yield of straw averaged as above is as follows:

Salt produced a loss equal to .12 cwt. per acre.

Bone meal produced a gain equal to 1.41 cwt. per acre.

Guano produced a gain equal to 2.87 cwt. per acre.

Blood and bone produced a gain equal to 1.26 cwt. per acre.

Gypsum produced a gain equal to 1.08 cwt. per acre.

The difference in the yield of the unfertilized plats, both in the quantity of wheat and straw, was probably owing to the fact that some of the plats being located near the fence were better protected during the winter. Prof. Ingersoll in his report says: "The results are only indicative, and should at least need the results of the same experiment repeated over a series of years before we could draw any definite conclusions."

Other parts of this ground have been platted for work and *Experiments in Horticulture* and Botany. There were planted in one section last fall twenty-three varieties of grapes; in another twenty varieties of raspberries; five of gooseberries; five of currants, and thirteen of strawberries. The results from these will be given in due time.

There were fifty-four varieties of potatoes planted last spring, and the comparative yield noted. "It may be well to remark," says Prof. Ingersoll, "that the latter part of the season was one of the severest drouth, and many fields of potatoes would scarcely pay for harvesting." The full list of varieties is too long and not of sufficient interest for publication. The ten that produced the greatest yield are:

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	Bushels Per Acre.
Snowflake	227.81
Strawberry Mercer	183.20
Michigan Prolific	173.87
Burbank's Seedling	141 87
Bliss Triumph	141.83
Trophy	138.13
Early Snowball	137.60
Lily No. 10	134.40
Early Ohio	128.
Tioga	128.

Thirteen other varieties yielded over 100 bushels per acre; these, with others, will be tested next year.

GRASSES,

Of the grasses, there were eight varieties of clover and twenty-five of other kinds sown, thirty-three in all. Many of them, no doubt, will require a few years to give them a fair test, consequently no report could be expected of them at this time.

A very careful experiment with raising corn was commenced last spring, which for a time bid fair to give interesting and satisfactory results, but the unfavorable season produced almost a failure of this, as well as all other crops of corn in this locality. A fair test could not be made; we will therefore defer giving results until another season, which I hope will be better adapted for the experiment.

During the past summer the University has been made a point for taking metereological observations, which is a matter of great importance to the work on the farm experiments and as a means of instruction.

The instruments consist of

1 standard thermometer.
1 maximum thermometer (self register.)
1 minimum thermometer (self register.)
1 hygrometer (wet and dry bulb thermometers.)
1 rain gauge.
1 Robinson's self-registering anemometer.
1 wind vane.
1 standard barometer.

Observations are taken three times each day, and each observation the following readings: The temperature, the humidity of the air, the rain fall, if any (or snow), duration of the storm, the direction and the velocity of the wind, the amount of cloudiness and the kinds of clouds, the direction from which they are moving, etc., etc. In course of time a record of these observations must be of very great value to the University.

The Mechanical Department is doing a good work. Besides the many different kinds of work done in the shop, the students, under the superintendence of the instructor, have erected and nearly completed, a building on the college grounds, eighteen by forty feet, in which to put horses and buggies

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of students who live in the country and board at home. This work of drafting, framing and completing the building is a part of their instruction.

In a word, the work in all the schools composing the University is being carried on very successfully, and is highly satisfactory to the Board of Trustees.

W. H. Ragan. I am beginning to have more confidence in Purdue than formerly. The institution, under its present management, is rapidly growing, and assuming proportions rightfully belonging to such a school.

Mr. Ratliff. One source of congratulation is in the temperate habits of our students. None use intoxicants, and but three use tobacco.

On motion of W. A. Ragan, J. W. Robison, of Illinois, J. S. Beatty, of Kentucky, and Chas. Lowder, of Iowa, were made honorary members.

The Society then proceeded to the election of officers, resulting as follows:

President, Sylvester Johnson; Secretary, W. H. Ragan; Treasurer, Daniel Cox; Executive Committeee, J. C. Ratliff, Dr. A. Furnas and L. B. Custer. The choice of Vice Presidents was referred to the Board of Horticulture.

The President then introduced Dr. A. W. Brayton, of Indianapolis, who addressed the Society.

FARMER, SOIL AND FOREST.

THE FARMER.

In all latitudes man needs food; in ours, food, shelter and clothing. These are the primal wants. To these ends some handle; others produce; all use. In this natural division of labor the farmer's part is to create. Commerce and consumption depend on his primitive activity. He directs the forces, and under his guidance gas, water and soil become house, dress and food. The farmer gives out the bread and controls marriage, for this varies as the food supply; all trades are to his account. If a man is not a farmer, it is because he has left for a time the primitive vocation, and if his skill, or service, or products, are not wanted by the farmer, he must again plant his feet in the soil, or cease to grow.

"The profit of the earth is for all; the king himself is served by the field."—*Solomon.*

"The first farmer was the first man, and all historic nobility depends on possession and use of the soil."—*Emerson.*

In hard times, tradesmen and waremakers take to the soil; if crops are good, bread and work is plenty, and cities fill up.

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"The farmer is a hoarded capital of health, as the farm is the capital of wealth; and it is from him that the health and power, moral and intellectual, of cities come. The city is always recruited from the country. The men in cities who are the centers of energy, the driving-wheels of trade, politics or practical arts, and the women of beauty and genius are the children or grandchildren of farmers, and are spending the energies which their fathers' hardy, silent life accumulated in frosty furrows, in poverty, necessity and darkness."—*Emerson.*

The farmer, then, is a continuous benefactor; his office of first importance. He stands for the necessities, for hard work and moderate gains. Dealing with nature, he learns patience; clinging to the soil, he represents permanence; living naturally, he is healthy; spending little and wisely, he has a competence; being the majority, he controls politics; observing the moralities, he lives virtuously. And so the farmer stands, the uncrowned king of the world, with merchants and professional men his servants. He makes and upholds governments; these are only excusable when seeking the best interests of husbandry.

THE FARM AN ASYLUM.

"All men," says Emerson, "keep the farm in reserve as an ayslum where, in case of mischance, to hide their poverty; as a solitude if they do not succeed in society. And who knows how many glances of remorse are turned this way from the bankrupts of trade, from mortified pleaders in courts and senates, or from the victims of idleness and pleasure. Poisoned by town life and town vices, the sufferer resolves: 'Well, my children, whom I have injured, shall go back to the land, to be recruited and cured by that which should have been my nursery and now shall be their hospital.'"

The citizen tires of city pleasures, and at least once a year he seeks the country. If the city offers libraries and social entertainments, the country has inspiration and contentment when these lose their attractions.

> "Who in sad cities dwell,
> Are of the green trees fully sensible."

And the melancholy Cowper says:

> "God made the country and man made the town,
> What wonder, then, that health and virtue,
> Gifts that can alone make sweet the bitter cup
> Life holds to us, should most abound.
> And least be threatened in the fields and groves."

Or, again, briefly expressed by Henry Vaughan:

> "If Eden be on earth at all,
> 'Tis that which we the country call."

THE SOIL AS AN EDUCATOR.

"I consider it the best part of an education to have been born and brought up in the country. There is virtue in the country houses, in gardens and orchards; in fields, streams and groves; in rustic recreations and plain manners, that neither cities nor universities enjoy. Nor is it creditable to the

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teaching that so few college graduates take to husbandry and rural pursuits. Held subordinate to thought as every calling should be, these promote intellectual freshness and moral vigor. They have been made classic by the genius of antiquity; they are recreations most becoming to every profession and rank in life:

> "Books, wise discourse, garden and fields
> And all the joys that unmixed nature yields."

* * * "A people's freshest literature springs from free soil, tilled by free men. Every man owes primary duty to the soil, and shall be held incapable by coming generations if he neglect planting an orchard at least if not a family, or book, for their benefit."

President White, of Purdue University, in his essay on the production of agricultural wealth, says: "The world over, the soil is impoverished by the touch of ignorance. The most fruitful means of producing agricultural wealth is the improvement of the farmer. What is now needed is the application of brain power, intelligence and science to the cultivator of the soil, and this can only be secured by education. The schools of Indiana are the best industrial investments the State has made. Its school tax is better than guano on the fields of the farmer. It adds fatness to the soil, and gives skill and industry to the tiller. If the vast sums of money now wasted in intemperance and other injurious consumption could be put into improvement of the heads and hearts of our rising generation of farmers, Indiana would soon be a garden."

It is not desired that the student give his attention to the study of agriculture or horticulture alone. Our State School of Farming does not shut the student from other sources of knowledge, of refining and humanizing culture.

Every child born into the world has, by virtue of both its divine and human heredity, and inalienable right to the growth of its powers, and should have through minority, and adult years also, the best mental and moral culture.

With improved agriculture will come collateral advantages, social and industrial; the suppression of demagogism and corrupt politicians will not be least.

Moral advantages will follow. The laws of nature are "the elder word of God." The student farmer is the nature student also, and studying or applying this elder word, he will feel the presence of the invisible but omnipotent Being, to whom study and labor is at once homage and prayer.

HORTICULTURE.

Horticulture is but a branch of agriculture; or shall we say the *hortus*, or garden, is only a smaller *ager*, or field? The garden and orchard is associated with the perfect condition of mankind; man is a gardener by birthright.

> "Who loves a garden still his Eden keeps;
> Perennial pleasures plants and wholesome harvests reaps."

"The garden is the delight of children, the pastime of women, the privilege of the poor man, as it is the ornament of the gentlemen, the praise of

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the scholar, the security of the citizen, placing man in his truest relations to the world in which he lives."

The orchard stands even nearer to man than the garden. Its fruits are more humanized and ethereal than the grosser products of the garden. In bloom, in fruit, in old age the orchard is alike beautiful. The muse delights in the orchard; from the gardens of Hesperides to the wild orchards of Thoreau, they appear in mythology, or perfume poetry.

Of orchard fruits, the apple is representative; it is historically coeval with the race and is civilized in the degree man himself is, the best apples being the later products. Currants came as Corinthian grapes to Europe in the Elizabethan age; by the apple, the cherry and peach are young as the names show; cherry from Cerasus, and the peach from ancient Persia.

"Fruits have the honor of being most widely diffused, geographically, grown with kindliest care, and of being first used by man as food. They still enter largely into the regimen of the cultivated nations, and are the fairest of civilizers. Like Orpheus, they tame the human passions to consonance and harmony by their lyric influence.

"The use of them is of that universal importance that we can not subsist in any plenty or elegance without them. And everywhere besides the cultivated man grows the orchard, to intimate his refinement in those excellencies most befitting his race.

"The Romans designated the union of all the virtues in the word we render fruit, and bread comes from Pan, the representative of nature, whose stores we gather for our common sustenance in our pantries. Biography shows that fruit has been the preferred food of the most illuminated persons of past times, and of many of the ablest. It is friendly to the human constitution, and has been made classic by the pens of poets who have celebrated its beauty and excellence."—*Alcott.*

Ladies and gentlemen, it is not necessary to set further before you the diginity and worth of the farmer, the gardener or orchard grower.

Perhaps I have continued thus far, because I am, by nature and training, a farmer, and am now as teacher of botany and zoology to youth, still daily related to the soil.

Even in cities it is well to teach of plants and animals, that the young may have a deeper love for nature and a better insight of life; that they may be subdued and silenced as they learn of the powers and utilities so meekly worn by men of the soil. Teachers are mainly country folk; sons and daughters of the soil, and as between an office and the farm, teachers had better advise boys to take to the soil, that they may,

> **"With unwearied hand**
> **Disdaining little delicacies seize**
> **The plow, and greatly independent live."**

I am pleased to be with and one of a company of which I can bring so good account.

Of whatever business, we are all physically of the soil; Homo means the humid, the moist; in life earth flows into flesh, and in death we return to it.

It becomes us, as I shall attempt in this hour, to consider our relations to the soil, as from it and to it we are; our relations as *users* of it, for that

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is all man in right should be; our relations as *abusers* of it, for that by either sin or ignorance, man is.

"The tilling of the soil is not of more vital interest to the peasant than it is to the prince. The advancement of agriculture is therefore the advancement of the human race. It is equally for the profit of the laborer and the man of capital. Good crops mean good times. They not only make full granaries, but also busy looms. They make cheerful the fireside of the farmer, and bright the furnace eyes in the factory. They bring long freight trains on the land, and whiten the seas with the filling sails of commerce. They oil the wheels of trade and all the joints of industry. Without agriculture civilization is endangered and the progress of the race impossible." —*H. W. Wiley.*

NATURAL CONDITIONS FAVORABLE TO AGRICULTURE.

From the garden and orchard we pass to the farm. Indiana is but a large farm, and of her two million and fifty thousand people most are farmers. Her territory of thirty-three thousand square miles, if all under cultivation, would make two hundred and sixty-four thousand farms of eighty acres each.

One-half this area is tilled. Men are here present who aided to conquer it from savages, and clear it of wild beasts and forests. It has been surveyed, fenced, built, threaded with railroads, dotted with towns and villages. Its population has increased from seventeen thousand in 1808, to over two millions in 1880.

Natural causes are in her favor. Winter rains or snows rarely delay travel or commerce; in May and June there is abundant moisture; the July and August harvest is bright and sunny; Indian summer follows with its dry days and mellow sunshine, the brief "squaw winter," whose frosts have dried the corn and prepared it for the harvest.

> "For past the yellow regiments of corn
> There came an Indian maiden, autumn born;
> And June returned and held her by the hand,
> And led Time's smiling Ruth through all the land."

Lake Michigan on the northern boundary and the Allegheny foot hills to the south, compel the east and west commerce of the States to cross Indiana, "paying tribute in a trail of gold along each iron track."

The State is the central point of the nation's population, the pathway of domestic commerce and a part of the highway of nations.

An equable temperature secures here freedom from violent changes or excesses which weaken vitality and debilitate the system. Malarial diseases, with their complications, are usually prevalent in new and fertile countries, newly subjected to the plow and but poorly drained; with us these are decreasing in the ratio their causes are removed. Plagues of Eastern countries, contagious fevers of the South, famine, with its concomitants of moral discord, disease and death, have not penetrated Indiana.

The fertility of its soil is the reason of its prosperity. Geologically and geographically, Indiana is happily situated. It is a part of the great Ameri-

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can valley. "During the glacial epoch a river of ice hundreds of miles in width advanced from the frozen North, plowing down the irregularities of the surface, bringing with it immense quantities of bowlders, gravel, sand and clay, from the paleozoic and crystalline beds of the North. At the close of the ice age, as the glaciers withdrew, they left a vast bed of bowlder clay, composed of the comminuted materials of native stones and imported rocks from every older strata, covering regions south of the upper lakes for a space of two hundred to two hundred and fifty miles to a depth of from fifty to two hundred and fifty feet."—*Professor Collett.*

The Indiana soil, formed from so great a variety of mineral detritus, has sand, clay and gravel mixed in due proportion. It is hygroscopic, absorbing, retaining and transmitting properly the gases and liquids essential to the growth of plants. Its mighty southern forests and fertile northern prairies, the fruits and cereals grown in such abundance and variety indicate its central position in the great valley plowed and fertilized by the glacier and torrent in the early ages of the world.

"Who," says Emerson, "are the farmer's servants? Not the Irish, nor the Coolies, but geology and chemistry, the quarry of the air, the water of the brook, the lightning of the cloud, the castings of the worm, the plow of the frost. Long before he was born, the sun of ages decomposed the rocks and mellowed up the land, soaked it with light and heat, covered it with vegetable film, then with forests, and accumulated the sphagnum whose decay made the peat of his meadows."

Thus favored by nature, situated in a latitude which is the world's best belt of life, the State invites labor, and rewards it with rich returns of material wealth. In short, as regards agriculture Indiana is distinguished by a happy combination of physical conditions.

THE PRESENT FAVORABLE CONDITIONS OF SOIL AND CLIMATE MAY NOT BE MAINTAINED.

Of the multiplied advantages above detailed, the equable temperature, the even distribution of moisture through the year, the disposition of lakes, rivers and level lands, the gentle slope to the southern sun, the composition of the fertile soil, the plenty of raw materials for the settler—wood, water, coal, limestone, sand, clay and iron—are gratuitous gifts. Yet these spontaneous contributions of nature alone will not feed, clothe or house the two million people of the State.

Our harvests of wheat and corn, the orchards, the vines that festoon our arbors, the garden vegetables, the tubers of the potato, the domestic fowls and quadrupeds were once the wild growths of distant lands. They have been naturalized, and in new homes their better qualities are ennobled by the cunning of man. Step by step the wild plants and vicious or useless animals have been driven on, and the earth fitted for the production of useful kinds. Waring against thorns and thistles, claws and fangs; taming and directing the fury of the elements, man has in some degree brought peace and recreated the world. Tilling the soil he has cultivated himself, and through the help of friendly herbs and plants, he has risen from the position

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of Nature's serf, by humble steps, until his foot is over the wild growth external and internal, and his hand is laid mightily on the elements.

The past has grown to the present, and yet with ages behind and poteney within—

> "The highest mounted mind
> Still sees the sacred morning spread
> The silent summits overhead."

All has been earned by toil. "The Father of the gods," said Virgil, "did not will that the way of agriculture should be easy." The best was not *given*, but has been *won* from nature.

This double gift—the spontaneous contribution of nature and the heritage of domesticated plants and animals, it behooves us to conserve and increase, lest the garden of the west become desolate. The present conditions, both natural and induced, are favorable, and seem permanent. And yet we have only to examine the ruins of the Mound Builders to know that large populations were supported in past times by agriculture in the Mississippi valley. We are by no means the first occupants. The number and magnitude of their earthworks, military, sacrificial, sepulchral and domestic, indicate the sites of populous settlements, whose inhabitants could not have been supported by hunting and fishing.

They raised, undoubtedly, the corn and pumpkin as we do. In locating their cities they were influenced by the same motives that govern the present inhabitants. The ruins about Marietta, Portsmouth, Circleville, Chillicothe, Chattanooga, Cincinnati, Vincennes and St. Louis, show that they occupied the sames sites, appreciating situations favorable to commerce or defense, as we should expect of an agricultural people. Food was cheap and abundant, else large masses ceuld not have subsisted while building the vast unproductive works—circles, squares, parallel roads and tumuli extending as at Newark, Ohio, over leagues of ground, and exceeding in cubical contents the great pyramids of Egypt.

The unity of purpose in these great works indicates a well-devised plan, which could be executed only under a consolidated political organization. They clothed themselves with woven goods, were proficients in pottery, in the making of stone implements; they had copper from Michigan, marine shells from the Gulf of Mexico, and mica plate from distant mountain regions; the same mounds contain materials from the most distant parts of North America; commerce and agriculture had taken the place of hunting and fishing. Upon their mounds are now growing trees of four centuries old, nourished by the moldering debris of preceding forests; of the absolute age of these ruins we can only conjecture. Whether the exclusion of these vast hordes from the Mississippi valley was due to war with barbarous tribes, or to the exhaustion of the fertility of the soil, or to both these causes combined, we know not. If exterminated by a more vigorous but less civilized race, we have a parallel in the subjugation of the Roman peoples by the Goths; if the treeless plains were exhausted, we have an example of restoration of the soil due to the growth and decay of forests over an immense area, once the cornfields of an exterminated people.

But we need not speculate as to the relations of the Mound Builders to

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the soil we occupy. Within the historical period we have record of large areas once as productive as our own State, but now little better than deserts. The architectural ruins and decayed internal improvements of Northern Africa, of Arabia, Syria, Mesopotamia, of large areas in Italy and Greece, tell of a dense population once supported in now comparatively lonely districts. Great armies, as the Persians and Crusaders, were fed in regions now desolated. A territory rivaling Europe in extent, supporting a population equal to present Christendom, has been withdrawn from human use, or at least scarcely adds any physical or moral good to the common interests of the human family.

"Every ship which carries our corn and wheat abroad is freighted with the life-blood of our soil. Unless some preventive measures be taken, the time will come when our fields, already under cultivation, will no longer respond to the caresses of the farmer, and the public domain will be limited to stretches of yellow sand and the peaks of inaccessible rocks. At such a time the question will be, 'Shall our growth in population and material prosperity cease and finally retrograde? or shall some means be devised by which the old acres shall be made new when there are no more new acres to make old?' No Columbus will arise in the coming years to discover in the unplowed waters of an unknown sea a new continent, marvelous in extent and fertility. Hereafter no pilgrim fathers shall lead forth an exodus to deplete the engorged arteries of our coming civilization. No Egypt, with its groaning granaries, whence we can import wheat and corn to feed our starving millions. In that day we shall have to adopt the doctrine of Malthus, or increase the productiveness of our fields."—*Wiley.*

CONSERVATION OF THE SOIL A MORAL OBLIGATION.

The decay of countries in Western Asia and Southern Europe to which I have alluded, was probably due in part to the action of climatic and geological causes, but mainly to war and misrule which cursed nearly every province subdued by the legions of the Cæsars. Battling with this double foe, the oppression of Rome and the destructive agencies of the inorganic world, the husbandmen of the conquered provinces were forced to succumb, and so useless woods or barren deserts succeeded the farms and vineyards which generations of patient toil had won from the primitive forests. Man should observe the law of both reason and religion, and use the world as not abusing it, remembering the law of relation of man to earth, as of earth to man is "each for all and all for each." We should be in such sympathy with nature that in the clod, the tree and the brook we recognize friends and fellow-workers to a divine end; to know that—

> **"Earth has tree and fruit within it,**
> **Life and thought the clod,**
> **Stones spring up to love and duty**
> **From the sun-kissed sod."**

It is man's own blood and kind who are to inherit the soil enriched with man's remains, and we owe our successors the earth in at least as good condition as it came from the wild beasts and forests whose organic remains compose its soil.

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In his sermon on "The Good Soldier of Jesus Christ," Mr. Martineau comments at length on the devastation man has brought on the earth by ignoring alike the teachings of conscience and revelation.

"And it may be remarked that as the earth has passed through these several stages of strife to produce a Christendom so by relaxing in the enterprises it has learned does it tend downwards, through inverted steps to wildness and the waste again.

"Let a people give up their contest with moral evil; disregard the injustice, the ignorance, the greediness, that may prevail among them, and part more and more with the Christian element of their civilization; and in declining the battle with sin, they will inevitable get embroiled with men."

Threats of war and revolution punish their unfaithfulness, and if then, instead of retracing their steps they yield again, and are driven before the storm, the very arts they had created, the structures they had raised, the usages they had established, are swept away; in that very day their thoughts perish. The portion they had reclaimed from the young earth's ruggedness is lost; and failing to stand fast against men, the finally get embroiled with nature, and are thrust down beneath her ever living hand.

Our duty to the race, as parts of a whole is plain; self interest is too often the impulse to action and narrowly and meanly we use the best of the soil and refuse to even plant trees, exclaiming bluffly, "Confound posterity! what has it ever done for us."

What a man has is not his own; it is loaned him until the next tenant takes his place. He must not despoil the fair heritage entrusted to him as an usufruct, but transmit it adorned and beautified.

CONSERVATION OF THE SOIL.

We have seen Indiana lands sapped by a succession of grain crops grown without fertilization.

In earlier days straw heaps were burned; hill lands have been cut away by spring and autumn freshets, until organic matters are gone, and only the skeleton of limestone and clay remains. In New England, we have unproductive farms. Large areas in Virginia are devitalized by a century of tobacco or cotton crops.

If the soil is not retained by proper methods of plowing and draining, by alternation of sod crops, as timothy and clover, with hoed crops, as corn and wheat, it is washed away to form the alluvium of distant river bottoms, or reappears as delta deposits.

There is, of course, conservation and restoration by nature of her working materials.

Nothing is wasted or passes into permanent form. But geological forces work in great cycles. A stratum of limestone is one, a clay sub-soil a second, and a black loam a third. But the limestone was slowly gathered in paleozoic times; the clay required a glacial age, and the top loam represents thousands of years of forest growth and decay. The sunbeams of the coal age slumber in the pits; at the call of man, their latent energy is renewed in fire and furnace, and again the carbon set free enters the plant, and lies dor-

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mant. "All things are flowing, even those that seem immovable. The adamant is always passing into smoke."

Liebig held the mineral theory of plant sustenance, against the belief of his times, that plants fed only on humus; that is, vegetable or animal mold. "A connection," said he, "exists between all the constituents of the earth, the water and the air, which take part in the life of the plant and the animal." "So intimate is this connection, that if a single link be wanting in the chain of causes converting inorganic matter into the means of organic activity, neither plant nor animal can exist."

Mr. George Marsh, speaking in the light of modern chemistry, says: "Nature has left it within the power of man, irreparably to derange the combinations of inorganic matter and of organic life, which, through the night of æons, she had been preparing and balancing to prepare the earth for his habitation, when, in the fullness of time, his creator should call him forth to enter into its possession."

If this be so, it becomes the farmer to disturb this balance between the organic and inorganic realms with thoughtful care, to stir the soil and lay off his furrows as one who must give account. He must suppress the wolf and weasel that his flocks and fowls may have safe place; the forest that fruit and grain may grow. The earth is for man, but he finds his estate in the possession of wild beasts and plants. To possess it rightly he must conquer it fairly, and with justice to the vanquished, or they will turn and rend him. He too often exceeds his just limits. Forests are felled until there is neither fuel for fire or shade for beast, nor homes for insect-destroying birds. Inundations and avalanches occur where belts of woodland left uncut would have bound the soil to the rocks. Waters have been allowed to run away which might have watered the cattle and fertilized the fields.

On seacoasts, semi-aquatic plants, fastening the sands, have been destroyed and the shifting dunes have devastated large areas.

Savage tribes interfere but little with the natural condition of vegetable or animal life, and produce scarcely more impression on the physical features of a country than do the birds of the air. But man becomes destructive in the ratio of his civilization. The Aryan family has swept nearly round the earth on its best line of latitude, and now the Mongolian is met on our western shores.

The Old World must be rebuilt and the New World better conserved, else the migrations of men must forsake isothermal laws and turn to the rich lands of the South. The overplus of Europe has sought Australia, India and North America. Are these fair lands to be devastated by man as Western Asia and Egypt have been? or is the tide to return and, by moral and political revolutions of Asiatic peoples and governments, and a better knowledge of the ways in which man reacts on soil and climate, regenerate the wasted areas now only sinking into a deeper physical degeneration?

More to the honor of a nation than the proudest triumphs of unjust wars are the physical improvements they have made in their domains. Lands rescued from the ocean by dyking as in Holland, lakes swamps and marshes reclaimed, coast dunes checked by plantations of shrubbery, land slides and avalanches restrained by forest belts, torrents subdued and inun-

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dations prevented—these give promise that man may make some atonement for his spendthrift waste of Nature's bounty.

CLIMATIC CHANGES.

In Indiana the forest area was necessarily reduced; superfluous waters have also been removed. What the effect has been on the climate is mainly conjecture. The memory of the oldest inhabitant is not authority on meteorology. The thermometer and barometer are in general use less than a century, and in a new country there is other work than composing climatic tables. The forest leveling and drainage probably modified the humidity and temperature; but to what extent one set of effects is opposed by another, or negatived by unknown causes, is problematical. That Indian summer, which is merely a warm, dry season following the great October frosts, is not as long or as continuous as before the clearing of the forests, is claimed as proof of the reaction of man upon the local climate.

The forest trees are so many great pumps supplying the clouds with rain; when these are stopped by the autumnal frosts, the air over great inland areas is void of moisture, and Indian summer is the result. With half the forests replaced by stubble fields which exhale but little water, the humidity of the atmosphere must be notably diminished; enough, perhaps, to modify the autumn climate of a large agricultural district as compared with the same when the forest was unbroken.

"It is disputed whether the means or extremes of temperature, the periods of the seasons, or the amount and distribution of precipitation and evaporation in any country whose annals are known, have undergone any change during the historical period."

MAN A NEW PHYSICAL ELEMENT.

The changes from the natural to the artificial condition of the terrestrial surface have been upon the whole destructive to the soil, and, so, detrimental to agriculture and opposed to the best interests of the great commonwealth of man.

A few desert, swamp or sea-swept areas have been reclaimed by the moderns. Within historic times a territory equaling Europe in size and Indiana in fertility has been almost withdrawn from human use; we conclude that virgin soils like the Mississippi valley should be conserved and brought to the highest limit of production, and as far as possible we must aid nature in renovating the regions wasted by man's improvidence.

With man a new physical element unknown to earlier periods was introduced. "Man," says Stopponi, "is a new telluric force, which in power and universality may be compared to the great forces of the earth." Brutes have not modified the surface of the earth to an equal extent with man. The action of brutes is conservative rather than destructive. Only as human allies do the domestic animals exercise a destructive agency in the garden of nature. The wild quadrupeds build up rather than tear down. The beaver has formed by his dams the great bogs of the Northern States. The bones and tusks of mastodons compose drift islands about the mouths of Siberian

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rivers. Vast masses of bones cemented with lime form the floors of extensive caves in Southern Europe. These animals did the earth no harm; like savage tribes they were passive. Like the lower forms of life which preceded them, the coral formers, chalk makers and shell fish, they modified the surface mainly by the withdrawal of the food they ate, and the deposition of their remains.

With man came destructive intelligence, and in his progress from savageism to this nineteenth century of elightenment, he has left scars upon the earth which only geological æons can obliterate.

"Not all the winds, and storms, and earthquakes, and seas, and seasons of the world have done so much to revolutionize the earth as man, the power of an endless life since the day he came forth upon it and received dominion over it."—*Horace Bushnell.*

That man is not entirely of material nature, but a power of a higher order, both in kind and degree, is the natural conclusion of these reflections.

As a savage, man gets his food and clothing from the wild beast and forest. He grows no vegetables, destroys neither forests nor noxious weeds. With civilization comes stationary life.

Once a shepherd and planter, the conquest of organic life is almost as complete as in advanced stages of civilization. In taming the plant and beast, man tames himself. The triumphs of our times are not over the organic world. Metalurgy, machinery, steam, electricity, chemistry—the problem of physical force applied to matter is only solved by refined and cultured ages. Within historic times few new species of food plants have been added to our tables or useful animals to our folds.

The contributions of America are the tomato, cranberry and blue grass, among plants, and the wild turkey among animals. The Indian corn and pumpkins grew in the patches of the Indians, and the potato had long been cultivated in Chili. With these America has in part paid her debt to Europe and Asia.*

Leaving the chase, and turned herdsman and farmer, man protects and propagates certain plants and fowls and beasts; he destroys their enemies, hawks, wolves and weeds, and so deranges the original balance of natural organisms; some are reduced in numbers, some utterly destroyed from the face of the earth, and others again are multiplied to man's advantage.

Forests are felled, bogs and marshes are drained and deserts irrigated; the local climate is modified; isthmuses are cut, rivers changed to canals; the sea is excluded by dikes, and so is extended over the shifting waters the empire commenced upon the solid land.

MAN AS RELATED TO OTHER SPECIES.

The introduction, modification or extirpation of certain vegetable and animal species has produced notable effects upon large areas. Whenever a

* I wish I could believe with some that America is not alone responsible for the introduction of the filthy weed, tobacco, the use of which is the most vulgar and pernicious habit engrafted by the semi-barbarism of modern civilization upon the less multifarious sensualism of ancient life; but the alleged occurrence of pipe-like objects in old Sclavonic, and, it has been said, in Hungarian sepulchres, is hardly sufficient evidence to accuse those races of complicity in this grave offense against the temperance and the refinement of modern society.—*Marsh.*

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native plant is destroyed or a foreign one introduced, a new geographical element is put in action. The old and new rarely balance each other. The new plants are not left to rot on the ground as the native plants did, but are carried to the consumers in towns and cities. They are eaten, burned, or used in building, made into clothing or paper, and finally as street sweepings or alley refuse they may raise the level of cities many feet above the surrounding country. The present streets of Rome are twenty feet above those of the ancient city; the floors of many Italian churches but six or seven centuries old are now as much below the adjacent streets as they were formerly above them. Heaps of city garbage two hundred feet in height formed a circular hill about Cairo, impeding the circulation of the air through the city and communication with the suburbs; during the French occupation, cannon commanding the city were mounted on these ramparts. The Nile, by its overflow, fertilized the soil, and so organic rubbish accumulated in the Egyptian cities. By lixivating these heaps of ancient and modern debris, Egypt makes annually one and a half million pounds of saltpeter. Chicago has filled a large area of lake front by rubbish accumulated within a few years. The cast-away pottery of ancient towns in Greece compose strata so extensive as to receive the name of the ceramic formation.

And so the rich organic matters centuries in forming are carted to cities, consumed, and thrown out as noisome offal, or passed as sewage to pollute the water courses. A small portion may return as artificial fertilizers to the soil from which it grew. Such is the case in Paris. The gardens of Asnieres exhibit the luxuriance of the tropics where a few years earlier were only worthless fields of sand. These have been restored by bringing to them the poisonous sewage of Paris.

Taking out and putting not in empties the sack. For every load that leaves a field a load should be returned. The roots of grasses, clover, corn and wheat stubble are left to decay in the earth, and increase its organic matters in some degree, but are not equal to the soil-forming power of the primitive forest. At the height of its growth in May and June, clover and timothy and cereal grains are probably as vigorous evaporators of moisture and coolers of the air as the native forest, but the forest is acting half the year with unabated vigor. Our farm crops are never so efficient in moderating climatic extremes or in conserving the surface and outline of the land as is the native forest.

INTRODUCED PLANTS.

Our cereal grains, edible bulbs and roots, and the multiplied fruits and flowers of the garden, are artificially, modified and improved varieties or races of wild self-propagating species. The history of some kinds is lost; of others, the identity of the wild and cultivated species has been established. The potato, corn, tomato and pumpkin, were unknown to the Europeans before the discovery of America. The wild corn is found on Oregon river bottoms; a specimen in the writer's possession from Prof. Ingersoll, raised by him from the wild seed, is as large as the ordinary ear of corn, but each kernel is entirely covered with chaff, in addition to the ordinary husks enveloping the cultivated corn.

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The potato is self-propagating in Spanish America; its tubers are small and inedible. Wild rye, barley and oats grow in Syria, but the grains are flat and scant of flour.

Volunteer crops are grown from the seed which is lost in harvesting in California. Barley has produced five such crops in succession.

The effect of cultivation on a wild species can not always be determined. Few wild plants have been experimented with. Some medicinal plants lose their virtues when cultivated. The Jesuits' Bark, or Cinchona trees, taken from South America to British India in Ward's air-tight glass cases which protected them from the injurious effects of the salt sea air, are richer in quinine than the South American trees. The chestnut, butternut, wild mulberry and raspberry are improved in size and flavor by a single generation of planting and training, and what the limit of such changes may be in any given species can only be determined by observation and experiment.

Most of our cultivated plants are believed to have originated in the temperate portions of Asia. The present products of the Nile valley, except wheat, were mostly unknown in the times of the Pharaohs. Of its present crops, cotton, rice, sugar, indigo, dates and sorghum are comparatively new importations. The grapes of America are both native and imported.

The Northmen about the year 1000 found grapes in profusion in Massachusetts. The great grape tree of Santa Barbara is notable. It is a foot in diameter, four feet above the ground; its vines cover an area of thirty-six square rods, and yearly produce twelve thousand pounds of grapes, in bunches weighing six or seven pounds.

The vine wood planks of the great doors of the cathedral at Ravena were thirteen feet long and fifteen inches wide. Their origin is unknown. Grape vines grow in Italy thirteen inches in circumference. I have measured a wild vine at Irvington, Indiana, five inches in diameter.

INTRODUCTION OF FOREIGN PLANTS.

Many plants are introduced for their utility; others for their beauty or fragrance, some for shade, others by accident.

Our weeping willows are said to have sprung from a slip sent from Smyrna to the poet Pope; the melon was brought to France by Rabelais; the Portuguese claim that the progenitor of all European and American orange trees was an Oriental tree transplanted to Lisbon and still living in the last generation. (Marsh). These interchanges have been made until there are now few food plants, ornamental trees or flowers, which the three civilized continents do not possess in common.

To those unfamiliar with such books as Wallace on Distribution, or Darwin's Voyage of the Ship Beagle, the facts of plant migration seem remarkable.

Less than one hundred species were known from St. Helena up to 1520. Its location as a half-way house on the ocean way, from Europe to the Indian seas, has increased the number to nearly eight hundred in three and a half centuries.

Of the seven hundred new species, probably not one-half were intentionally introduced. The tares go with the wheat. The Herbarium of a

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botanist, the upsetting of a wagon, unpacking of a box, changing the stuffing in a saddle, the curative herbs of the pioneer—these are among the incidents by which plants of one country find a home in another.

From the straw and grass used in packing at Rome the art treasures of Thorvaldson, sprang up in the court yard of the Thorvaldson's museum, twenty fine species belonging to the Roman Campagna. Some of these were preserval and cultivated in memory of the sculptor, and at least four are now naturalized about the city of Copenhagan.

Turkish armies carried weeds to Vienna; Russian troops brought the plants of the steppes to the suburbs of Paris; during the late Franco-German war, the seeds of many species of Northern African plants were introduced with the imported horse feed.

Some of these species of Algerian weeds are valuable forage plants, they have braved the cold of severe winters, and are forming extensive meadows, changing soils formerly arid into veritable oases.

The power of plants to accommodate themselves to new habitats, is both detrimental and favorable to agriculture.

Often under the new conditions, both the weeds and valuable plants grow ranker than in their native home.

As a general rule European forest and ornamental trees are not suited to the climate of Central North America. The converse is also true. Distinctively American garden vegetables, as the tomato and green corn, are not as thrifty and sapid in Europe as in the United States.

A common water weed with us, the Anacharis canadensis, is not inclined to spread in our ponds and streams, but in some English rivers and canals it forms an impediment to the current and a hindrance to navigation.

An esculent thistle, the European cardoon, has escaped from the Spanish gardens on the LaPlata, and now forms impenetrable thickets extending hundreds of miles over the pampas.

EFFECTS OF DOMESTICATION.

As a general rule domestication, either of plants or animals, devitalizes. Favored by man, species become dependent on man, and left to themselves can not hold their own against their wild allies.

Tempests which strip cornfields, vineyards and fruit trees of their leaves often spare plants of spontaneous growth.*

The domesticated varieties may be acclimatized to bear a degree of heat or cold that would prove destructive in the wild state. It may require several years to adapt a plant to a new country.

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*The wild plant is much hardier than the domesticated vegetable, and the same law prevails in animated brute and even human life. The beasts of the chase are more capable of endurance and privation, and more tenacious of life than the domesticated animals which most nearly resemble them. The savage fights on after he has received half a dozen mortal wounds, the least of which would have instantly paralyzed his civilized enemy, and, like the wild boar, he has been known to press forward along the shaft of the spear which was transpiercing his vitals, and to deal a death-blow on the soldier who wielded it. Expose untamed and domesticated forms of life, together, to an entire set of physical conditions equally alien to the former habits of both, so that every power of resistance and accommodation will be called into action, and the wild plant or animal will live while the domesticated will perish.—*Marsh*, *p*. 73.

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In Sierra Leone the northern wheat when first planted grew mainly straw and leaf. The ears were few and the grain spongy and small.

The second crop from this seed was improved, and after a few years the wheat was as fertile as elsewhere. By sowing spring wheat in autumn, or autumn wheat in spring, either will produce the other. Three or four years are required for the transformation. (Darwin, Vol. I, p. 80.)

Minnesota corn has been trained to ripen in six weeks less time than Kentucky corn.

The fall apples of the South become good winter keepers in the North; while the best keeping apples of the North become perishable when raised in the South. We "plant over" our corn-fields with the quicker growing New England corn.

Wild species vary as to the climate. The white pine is a giant in Minnesota, but a scraggy tree in Indiana; the red cedar is a giant in the South and a pigmy in the North.

The season of ripening varies in cultivated species with the latitude. Seeds of the same species, having a wide range of latitude, come to maturity sooner the farther north they are sown. It is a recognized fact that the cereals attain the highest degree of perfection near the northern limit of their growth. The French Minister of Agriculture found that barley seed grown at Alten, Norway, 70° north latitude, when sown near Vincennes, France, ripened in seventy-three days, a gain of thirty-seven days over grain grown from French seed. Norway wheat ripened in French soil in seventy-four days, while the native French wheat required one hundred and five days. Like experiments with peas, beans and corn also proved that seed procured from a higher latitude uniformly matured an earlier crop.

The experiments of Mr. U. S. Hollister, on tomatoes, peas, corn, squash and watermelon, as detailed in the Annual Report of the Minnesota State Horticultural Society for 1879, establish the same principle. In the northern tier of States it is essential to procure the earliest seed, and so combat a short season and early frost. In the latitude of Indiana, where earliness is essential to successful gardening, the importation of northern seeds may prove highly important as a matter of profit. Ten days saved on a single staple crop, such as peas or early tomatoes, might double the profit of the season's work.

EXTIRPATION OF VEGETABLES.

While it is possible to *modify* profoundly the characters of plants by cultivation, we have no positive history of the complete extirpation of a species in recent times.

Some medicinal plants known to the ancients, as Balm of Gilead, also a water lily represented on many Egyptian tombs, are not known to us.

The Yew tree (*Taxus baccata*), so much used by wood carvers and turners, is now rare in Greece and is dying out in Germany. The papyrus, once common in Egypt, is now confined to a few localities.

In China, where a large population is supported on a small area, there are large regions in which it is impossible to find a single weed, and an eminent English farmer, Mr. Coke, offered in vain a reward for any weed found in a large wheat field. Perhaps the best definition of a weed is a "plant out of

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place"—certainly better for the farmer's purpose than Mr. Emerson's ideal definition of a weed as a plant whose useful properties have not yet been discovered by man.

All the operations of farming are destructive to the native flora of a new country. The domestic drive out the wild vegetables, and with the armies of settlers of a new country come troops of undesired camp followers; "unbidden and hungry guests, the gypsies of the vegetable world," with appetites improved by the change to a new climate. These even drive out the indigenous flowering plants, as in the roadsides of Illinois farms, where the native grasses and prairie flowers have given way to rank growths of rag weed.

Accidents sometimes limit the spread of foreign species in new countries. The Lombardy poplar is a diœcious species and like other poplars and willows grows readily from cuttings.

These slips have been taken usually from the staminate or male tree, and as a result the poplar does not produce seed in many of its new regions.

It is fortunate that so worthless a tree is thus prevented from propagating itself by seed, and so, possibly, becoming an annoyance to the agriculturist.

FOREST TREES AS WEEDS.

If a weed be a plant out of place, we have them at both extremes of the vegetable world—the fungi which destroy fruit and the forests which cover a new country are alike weeds.* From the Atlantic slope to the prairies the forest was the main obstacle to be encountered in the early settlements. The pioneers felled and girdled and burned that they might plant and harvest. The State seal of Indiana is a fit illustration of the war of man against beast and weed—the American bison with tail erect is fleeing on the one hand, while on the other the venerable columns of the primeval forest are falling before the axe of the pioneer farmer. Mr. Collett reports in his statistics that timber is still too abundant; that not more than one-half the tillable soil has been reduced to culture according to the assessor's returns.

And, again, on page six, we read: "The forest of mighty trees were an impediment which required for each acre the labor of half a month to hew down, burn and prepare for cultivation."

With a few exceptional areas we infer that Europe and Asia were covered with forest growths, which were destroyed as successive areas were inhabited.

The proofs are based in part on the remains of trees found associated with works of primitive art in bogs and marshes of districts without forests within the time of written annals; in part on the Grecian and Roman records of unbroken woods which covered provinces that have been without forests for centuries.

In regions now stripped of trees the old geographical names and terminations, etymologically signifying forest or grave, are philological evi-

*Among the most destructive of plants to farmers and fruit growers are the parasitic fungi and moulds, which are quite probably the natural product of the excessive manuring and artifical stimulation of the growth of the plants on which they live. The wine growing regions of Europe consume over 40,000 tons of sulphur from Sicily annually as a remedy against the grape disease. Wines like the red wine of Mount Etna, which sold for one cent a bottle in 1840, are now worth half a dozen times that sum, and the price of sulphur has risen in the same proportion.

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dences of forest regions, just as Beaver dam, Wolf creek, and the like are proofs of the abundance of these animals in early times in Indiana, though now extinct. The rapidity with which countries abandoned to nature or devastated by great fires clothe themselves with herbs and shrubs, and after longer intervals with dense forests, are evidences drawn from the present economy of nature.

Wherever there is moisture, freedom from perpetual frost, the depredations of man or quadrupeds, trees will certainly grow.

Lichens and mosses first grow on the naked rock; these retain the moisture of rain and dew, collect the dust scattered by winds, and finally by their decay enrich the soil thus collected. The gases evolved in growth aid in decomposing the rock, and so from air, rock and plant a thin soil is made. The seeds of hardy shrubs and evergreens blow to the place, or are brought by birds and squirrels, and soon the forests have a firm foothold. In this way, in the course of centuries even the molten lava beds are reduced to a fertile soil. Etna was wooded up to the great eruption of 1631, and even now the cactus makes inroads on the refractory lava beds. But it takes time to form a soil. Better preserve it than devastate it, and then wait for nature to renew it. The farmer sometimes lets the land lie fallow that it may gather strength. The forest made the Indiana soil. If it has been the worst weed, it has also been the best friend.

CONCLUSION.—USES OF THE FOREST.

Trees are the noblest form of vegetable life. Like the human race, they do best in communities, the old upholding and supporting the young. Forests modify climate, breaking the force of the winds, protecting the earth from intense heat, and serving as reservoirs for the supply of running waters. They form a cool retreat in summer; invite the early arrival and prolong the stay, and insure the general distribution of insect-eating birds. They retard the circulation of atmosphere, and so retard evaporation. The shed leaves protect the soil, and like a sponge absorb and retain the moisture; this, in turn, is taken up by the roots, is expired from the leaves, and so increases the humidity of the air, and lowers its temperature. In a word, the forests of the Mississippi valley, exert in the interior an influence similar to that of the sea on the climate of islands and coasts; they water the soil and increase its fertility.

On the prairies, shelter belts are indispensable to fruit growing.

Even an Osage Orange hedge, five or six feet in height, will protect an area of fifty or sixty feet in width, from those occasional northwest blasts, which often sweep from the Rocky Mountains to the Kentucky foothills, blasting the buds of fruit trees, which have expanded under the influence of the almost summer temperature of the spring south winds.

The pleasures of a country life are associated intimately with trees; no rural scene is so attractive as a park with a carpet of green sward. Every farmer or fruit grower should protect or plant timber belts, and even if he do not enjoy its profit or shade, it will be an invaluable heritage to his children.

"Our ideas of rural felicity are a country of sufficient relief and depression of surface to admit of perfect drainage, divided in proper proportions

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between woodland, pasture, meadow and field, with springs gushing out from the shaded recesses of the forest and furnishing perennial waters to the streams which flow through the lowlands, with the rising knoll crowned by a neat painted farm house and ample barns, protected by locust groves or fruit-bearing orchards, alike from winter winds and summer heats; with fields enclosed by well trimmed hedges and pastures dotted with clumps of trees, to which cattle can resort for shelter from the mid-day sun or the drifting storm; while, as a conspicuous feature in the landscape should stand out in bold relief the village church and village school-house, a signal symbol of the morality and intelligence of its inhabitants."

With this beautiful picture of rustic landscape, drawn by the ready pen of Foster, I leave the subject of the hour with you, only remarking that the continuance of this happy state is dependent on the conservation of the soil and the preservation of the forest. These, I believe, are so interdependent and withal so poorly understood, that I am justified in the selection of this topic for your consideration.

W. H. Ragan. I am sorry that Dr. Brayton could not have remained to have delivered his interesting address this P. M., in its regular order. He would have had a better audience, as such a paper certainly deserves. I do not wish to take up valuable time in discussing this able paper, only to refer to one incident connected with its delivery. When our Society met at Danville two years ago, a high compliment was passed upon the character of its membership by the old janitor of the court room in which we met, in the remark that he never had had so little trouble in cleaning up after any public meeting, as scarcely any of the members seemed to have used tobacco. The second compliment was in the very audible applause, just heard, when Dr. Brayton touched upon the filthy and offensive character of the "Indian weed." These incidents fairly illustrate the refining character of Horticultural Societies.

Dr. R. T. Brown. Weeds have their uses. I was reminded while the doctor was reading his carefully prepared paper, that while astronomers are speculating as to the probable time required in which nature's great furnace, the sun, will be consumed, that a more important question for us to consider is how long, under the present wasteful system of husbandry, will we be in exhausting the resources of mother earth? We have a mine of wealth in our weeds that we persist in regarding as a nuisance. The coat of verdure that persistently forces itself upon us in the shape of weeds, should be utilized as fertilizers of our rapidly exhausting soil. In China and Japan, and the more densely populated portions of the world, they have already learned to heed the warning.

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J. H. Priest. I still further desire to test the sentiment of this meeting on the tobacco question, by a motion that all who do not use it shall rise to their feet.

W. A. Ragan. I shall oppose the motion, as I do not wish to see my friends who are so unfortunate as to use the weed, exposed in this way.

The motion was laid on the table.

At this juncture, J. G. Kingsbury read the paper of Granville Cowing on

SMALL FRUITS AND THEIR CULTIVATION.

To enable you to form an imperfect idea of the rapid increase in the production of three of the leading small fruits, I will begin my subject with a statement taken from a recent report of the local assistant of the Census Bureau in Chicago concerning the quantity of strawberries, blackberries and raspberries sold in that market during the present year, together with average price and total value of same. One-fourth of the whole amount was consumed in Chicago and the remainder sent to other markets:

	Quantities.	Average Price.	Value.
Strawberries,	20,000,000 qts.,	10 cts. per qt.,	$2,000,000
Blackberries,	12,000,000 qts.,	12½ cts. per qt.,	1,500,000
Raspberries,	3,500,000 qts.,	12½ cts. per qt.,	437,500
Total.....			$3,937,500

These figures may be too large but are the most reliable that can be obtained. The amount of fruit sold this season in Chicago was double that of four years ago. Six million quarts of strawberries were received in Cincinnati this season, one-fourth of which were consumed within its limits and the remainder sent to other markets, an increase in that market over the year 1879 of 640,000 quarts. When it is remembered that these are but two of the many great markets of our country we begin to be able to form a limited idea of the magnitude of our small fruit production, an industry which fairly began its development with the dissemination of Wilson's Albany strawberry about the year 1860. That variety, I learn from a newspaper paragraph, was grown from seed in 1850, near Albany, N. Y., by a Scotchman named Wilson, a practical, plain man, who was engaged in the nursery business, who exhibited his unselfish disposition by dividing plants of his seedling with his neighbors, and who, when its value was fully established, had less plants of it to sell than any of them. It was named Wilson's Albany, and at once took its place as the most valuable variety for commercial purposes ever presented, a position it still maintains to a great extent. Mr. Wilson died some years ago almost forgotten, but the fruit growers and fruit consumers of this country owe him a debt greater than many that have been paid in costly monuments of bronze and marble. The only variety yet in-

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troduced that threatens to divide the field with his seedling for long shipments is Capt. Jack, but its berries have an unfortunate habit of parting from the hull, which may prevent it from taking the lead.

STRAWBERRIES.

In this locality, the strawberry crop was an average one in quantity, but, owing to frequent late spring frosts, not as many large and perfect berries were produced as in 1879. My crop was mainly derived from Crescent Seedling, Cumberland Triumph, Champion, Captain Jack and Kentucky. These are the most profitable varieties I now cultivate. Without them, my strawberry crop this season would have been almost a total failure.

Crescent Seedling continues to grow in favor as the most vigorous and productive variety. Except in very wet weather, it proves to be a fair shipping berry. Its bright scarlet color is very attractive, and it averages larger in size than Wilson's Albany. It is variable in flavor; sometimes rather insipid, often piquant, and when ripened in the fervent heat of the last days of June, not excelled in sweetness by any other variety. My first ripe berries were derived from it on the 25th of May, and the last on the 30th of June.

Cumberland Triumph.—Not quite perfect, but if I were restricted to but one variety, it would be this. The uniformly large size, beautiful appearance and fine flavor of its berries, always enable them to command the highest price in market. It is a robust grower, and will produce a more vigorous plant and a larger berry on thin soil than any other variety I am acquainted with. It is not sufficiently solid to endure long shipments.

Champion is next in productiveness to Crescent, and produces much larger berries of a brilliant dark scarlet color. Decidedly tart, unless fully ripe and rather soft. Fruited it this season near Windsor Chief, and found no difference between them. If one is a seedling of the other, nature has, in this instance, departed from her usual habit by reproducing herself without a trace of variation.

Captain Jack.—The warmth and excessive moisture of last winter seemed to impair the vitality of this variety. It made but a feeble growth, and did not produce more that one-half its usual amount of fruit.

Kentucky is still the best very late variety that has been generally tested. Gathered berries from it on the 7th of July. On my soil it continues long in bearing.

Glendale is a late variety, but not quite as late as Kentucky; produces larger and more solid berries than last named variety, but not equal to them in flavor. A strong grower, and very productive. Fruit as firm as Wilson, and light scarlet in color. Will no doubt be a popular market variety.

Duchess is a sturdy grower and very productive. Berries of medium size, firm and of fair flavor. Very early and liable, when in flower, to be injured by late spring frosts.

Miner's Prolific is a vigorous, fruitful variety, producing large, dark, scarlet, handsome berries, in color much like Chas. Downing. Taken in detail

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I can find nothing to condemn in this variety, yet it did not prove as profitable as Cumberland Triumph, Crescent or Champion.

Sharpless was seriously injured by late spring frosts and produced but few fair berries. I have no doubt it will do better in an average season.

Great American and *Sterling* proved more satisfactory this season than heretofore. Elevated clay soil appears to suit them best.

Longfellow is a strong grower and produces a very long, solid berry, of a light scarlet color and of excellent flavor. It is a promising new variety.

Continental, Centennial, Cinderella, Pioneer, Essex Beauty, Red Jacket, Garden, President Lincoln, Damask Beauty, Black Defiance, Forest Rose and Huddleston's Favorite have thus far failed to manifest any valuable qualities on my soil. Green Prolific is not as productive nor as attractive in color as Crescent, nor more firm nor of better flavor. The heat and drought of October, 1879, combined with the excessive moisture of the succeeding winter, killed a large proportion of the plants of Monarch and seriously impaired the vitality of some other varieties. Strawberry plants set last spring owing to drought have made but feeble growth and can not produce more than half an ordinary crop next spring. Beds planted two years ago promise a full crop.

Planting, Cultivation, etc.—Strawberry plants can be set most profitably in early spring while the ground is moist and the air cool. If done then, watering and shading will be unnecessary. Rows should be three and one-half feet apart. In the rows plants should be placed from eighteen inches to three feet apart, according to the habit of the variety. Plants of such varieties as Duncan and Duchess should not be more than eighteen inches apart, while plants of Crescent and C. Triumph may be planted three feet apart. Matted rows are most profitable and should be at least one foot wide. New beds should receive constant cultivation throughout the season. A two-horse walking plough is an excellent implement for that purpose. At the approach of winter all plants should be covered with some light material to prevent upheaval by frost. Wheat straw is excellent for that purpose. The mulch should not be removed in spring until heavy frosts cease to fall. No cultivation should be given in spring to bearing beds until after the crop has been gathered.

BLACKBERRIES.

Owing to the unusual mildness of last winter all varieties of blackberries passed through it in good condition and produced a fair crop of fruit. Kittatinny, ordinarily worthless here, was loaded with large luscious berries and was almost free from rust. But it has produced but two fair crops within the the last eight years, and can not be relied upon. *Snyder* produced an immense crop of delicious berries. As it ripens early it was but little affected by the drought which began about the middle of July. Its fruit is of medium size, of a brilliant black color and almost destitute of core. *Taylor's Prolific* is equally as productive as Snyder and ten days or two weeks later in ripening. It has in perfection the exquisite flavor of the wild dewberry of the South and produces a long berry somewhat larger than that of Snyder. In productiveness, hardiness and entire exemption from rust, Snyder and Taylor's

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prolific, for this latitude, are certainly superior to any other well tested kinds and might with profit supplant the varieties now occupying a place on the star list of this society. *Wallace* is a new and promising variety. It is a robust grower, with broad leaves and produces immense clusters of large, delicious berries which are borne on the tips of its branches. It appears to be perfectly hardy and free from rust. *Knox* also promises to be valuable. *Western Triumph* appears to be subject to rust and therefore can not be recommended. During the berry season I picked one quart each of average berries of Kittatinny, Snyder, Taylor's Prolific and Wallace and sent them, properly labeled, to the editors of the Indiana Farmer, for the purpose of obtaining their opinion concerning comparative appearance and flavor of same. The following response was given through the columns of their paper:

"Our editorial and clerical palates are somewhat divided upon their merits. The majority, however, ranked them in the following order: Taylor's Prolific, Wallace, Snyder and Kittatinny. The Taylor's were regarded as the sweetest and best flavored and were fully equal to the others in size. The Taylor being a native of Indiana we are quite proud to find it ranking so high when compared with the other more noted varieties. In sampling for the test it is proper to state that the name of each variety was kept out of sight till after judgment was pronounced."

I have grown Snyder for six years and during that time it has not failed to produce a crop of berries, and has never exhibited any symptoms of rust. Taylor's Prolific, Snyder and Wallace, three of the best blackberries now cultivated in this latitude, and Gregg, the best blackcap raspberry ever presented to the public, all originated in the State of Indiana.

The drought which prevailed during the summer and fall of this year, prevented the formation of the usual amount of blackberry wood. This, combined with the fact that the intense cold of last month, has impaired the vitality of such tender varieties as Lawton and Kittatinny, indicates a short crop of blackberries for 1881, and, consequently, high prices.

Planting, Cultivation, etc.—Blackberries should be planted in rows eight feet apart, with plants two and a half feet apart in the row. When two feet high, plants should be deprived of the leading bud, to induce them to form lateral branches, and should be allowed to form a hedge-like, self-supporting line in the row. Shallow cultivation between the rows should be given. Deep cultivation injures the plants by breaking their roots and causing plants to spring up between the rows.

RASPBERRIES.

Gregg.—This, no doubt, is the best very late blackcap raspberry ever cultivated. Its berries are larger and more beautiful than those of any other blackcap variety and sell for a higher price. It ships well, and is more attractive in color than Mammoth Cluster, which ripens with it and which has heretofore been the leading late variety. It is hardy and a remarkably strong grower. If pinched when two feet high, to induce the growth to lateral branches, the amount of fruit-bearing wood will be greatly increased

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and the necessity for artificial support be obviated. By cultivating an early variety with it, the length of the raspberry season can be almost doubled. Doolittle's Blackcap has ripened the bulk of its crop when the first berries of Gregg begin to color. When first disseminated many spurious plants of Gregg were sent out, but almost every respectable nurseryman now has them true to name. In the spring of 1878, I obtained plants of it from four widely separated nurseries, planted them separately and found them all alike and all true to name.

Turner.—For several years I grew this variety on black loam, where it was invariably unproductive. Last season I fruited it for the first time on elevated, thin clay soil, where it produced an abundant crop of large, delicious berries, and was in every other respect perfectly satisfactory. It is perfectly hardy and not excelled in flavor by any other red raspberry.

Cuthbert, or Queen of the Market.—This, on account of its hardiness, productiveness, flavor and beautiful garnet color, will probably be the leading red raspberry for some time to come.

Reliance and Early Prolific are two hardy varieties, producing heavy crops of large berries of a dull red color and medium flavor.

Florence is a yellow variety of strong growth and very productive, but sour and unpalatable. Roots from tips. The same directions relative to planting and cultivating blackberries will apply to raspberries, except that rows of the latter need not be more than seven feet apart.

DISCUSSION ON SMALL FRUITS.

Jos. Gilbert. The culture of small fruits for market is becoming an extensive business. I have not been keeping posted in reference to many of the newer varieties. With us, on the light soils near Terre Haute, the Green Prolific continues to be a favorite. The Wilson is not reliable on our soil. I think the writer is mistaken in reference to the origin of the Wilson's Albany strawberry.

NOTE.—The expression of doubt, above referred to, has elicited the following from the well known fruit grower and author, Peter Henderson.—*Secretary.*

NEW YORK, December 27, 1880.

Wilson's Albany strawberry was raised by James Wilson, nurseryman and florist, Albany, New York, somewhere about 1850, I think. Mr. Wilson and all his sons are now dead—the last at the head of his regiment in the battle of the Wilderness. I was intimate with the family.

PETER HENDERSON.

The Green Prolific must be grown with other varieties, as it is pistilate.

W. C. Steele. The Crescent is not a good shipper. Cumberland Triumph is our best family berry. The Wallace blackberry

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is the sweetest. The Wilson's Early has never rusted with me. The Turner raspberry is our finest red variety. If not thinned, it inclines to crowd too much by throwing up numberless suckers. The Glendale is very fine, but lacking in color.

Dr. Gifford. The Green Prolific is our main dependence.

J. W. Robison, of Illinois. The Crescent is not uniform in its habits. Have grown 14,000 quarts per acre, or at that rate. I think it our most profitable variety, though it is not a good shipper for long distances. The Turner is the best red raspberry, while the Gregg leads among blackcaps. We have a new disease—a white blotch on the foliage and spreading to the canes, that threatens will be a serious matter with our raspberries. As yet we know but little about it.

On motion, the Society adjourned.

AFTERNOON SESSION.

On reassembling at half-past one, the President in the chair, it was proposed to open the

QUERY BOX.

Query No. 1. "I wish to plant forty additional apple trees for market, not more than two varieties. What shall I plant, hardihood of tree and other qualities considered?"—I. N. BARKER.

Dr. Furnas. There are various circumstances to be considered in answering such a question, such as soil exposure, etc. In most cases, for our latitude, I should say Ben Davis and Smith's Cider about equally divided.

No. 2. "What induces the attack of the aphis on the apple tree roots, and what the prevention and remedy?"

Dr. Brown. Think they attack trees that are on the decline. Lime or salt might prove efficient remedies.

Dr. Furnas. They are worse of dry seasons, when they may be found near the surface.

Hobbs. We are annoyed considerably by them. Other dealers decline to received trees that are affected.

W. H. Ragan. They are worse in loose dry soil. They render the roots unsightly by producing warty excrescences, sometimes

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even killing them outright. When trees are transplanted into the orchard, generally a little deeper than they have grown in the nursery, they do not seem to injure them so much.

L. B. Custer. I think trees that are affected should not be planted—should be burned.

Dr. Warder. The woolly aphis is known to the authors as American Blight. It is a native insect found in the roots of the thorn and crab. Roots that are affected should be washed in a weak solution of potash.

Z. S. Ragan. They affect the surface roots most, and when planted a little deeper they disappear. Banking up orchard trees will destroy them.

Dr. Warder was now introduced, and read his paper on

TREES.

Mr. President and Fellow-Members of the Indiana Horticultural Society:

Many a time and often has it been my pleasure, yes, and profit also, to meet with you at your annual gatherings, and always have your meetings been left with the fond anticipations of a renewal of the enjoyment at the next annual revolution of the seasons.

To be with you now, and at this place, with its hospitable and cultured society, has been a pleasant dream during the past month, and, dream-like, the anticipated pleasure has been but a disturbed vision, owing to the many uncertainties of the weather at this season and the failing health attendant upon advancing years, so that it seemed unsafe to make any promise in acceptance of your very kind invitation, but here we stand, face to face in each other's presence. For this privilege and for the countless blessings that attend our pathway in life, how can we be sufficiently thankful to the Giver of all good gifts?

We may, perhaps, endeavor to render our thanks to Him in an acceptable way by trying to meliorate the conditions of humanity by improving this beautiful world in which he has placed us.

Upon this occasion it has been proposed that your attention should be called to the present condition of the woodlands of your fertile State. You will be asked to stop in the career of destruction which has been going on during the past generation, to ask yourselves whether you may not already have carried the process of clearing the land of its natural sylvan covering, and of culling out from the remaining woodlands so large a proportion of the most valuable trees as to have greatly diminished the money worth of the original forest by this cutting; and whether you do not incur the risk of affecting the climate of this and adjoining States by reducing the area of woodlands too greatly in certain regions. The census of 1876 represents your proportion of woodland at 39 per cent. of the entire area of the State The forest area of this county is reported at 41.1 per cent. This we must

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expect to have been greatly reduced during the past decade, as will be shown in the census of 1880.

The timber question may claim your attention. Your excellent commissioner of statistics admits that only thirty-five per cent of your area is woodland, and, with the too liberal estimate of *ten* trees per acre, capable of furnishing 2,000 feet of lumber per tree, he figures that there are logs enough to keep the 1,587 saw-mills now in operation constantly at work for 108 years. Perhaps he is too sanguine in his estimates, as he certainly is when he says that a healthy oak of three feet diameter will double its lumber volume in ninety-six years.

Mr. Collett has his apprehensions, however, and his warnings are expressed in these terms: "The rapidity with which a much less population has consumed and destroyed the other sixty-five per cent of the timber once existing in the State warns us not to wantonly waste what we have left." Thank him for that.

Within the lifetime of men still living among you large portions of your State were covered by a dense primeval forest. This growth was composed of many enormous trees of some of our most valuable species, which presented a formidable barrier to the agriculturist, and yet they were rightfully considered by the early settlers as indices of the great fertility of the soil upon which they stood.

With stalwart arms wielding sharp axes, and with unflinching will, the pioneers of this district of the new trans-Appalachian region surmounted all difficulties in opening the forest to the sun for the fructifying of the immense crops of food plants which the soil was capable of producing. The result is before us in this fertile valley, and in vast stretches of your noble State with a population already reaching two millions.

It is not to be expected that a people who have for two or three generations been so actively engaged in the destruction of the forest trees which had obstructed their progress should entertain any feelings of admiration and regard for a mere tree, quâ tree, much less should we expect them to busy themselves in the planting of tracts of land with a view to the growth of other forests. The native forests were looked upon as incumberers of the soil, and the supply of timber was considered inexhaustible—to the early settlers it was so in fact, but how do their descendants stand to-day? Although by the last census, that of 1870, Indiana is represented as having thirty-nine per cent. of her surface covered with trees, these have been so culled of their choicest treasures in all accessible places as now to be of little value as sources of supply for good lumber, and we may safely count upon a large reduction, even of the *area* of woodland represented by the census of the current year.

You will observe that the timbered portions are here designated *woodlands,* rather than *forests*, and the distinction is not without a difference—by no means; for while all uncultivated land having trees remaining upon it may be styled *woods*, even when composed of very inferior trees of little value, and that depreciating by decay, the well managed forest, in the hands of an intelligent and educated forester, will be freed from worthless trees, it will be supplied by planting with a regular succession, so that it shall be

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constantly enhancing in value from year to year, from one decade to another. As yet we may be said to have no real forests in America, except portions of the forest primeval that may have escaped from the ruthless hand of destructive man, and perhaps some limited areas that have been judiciously treated by provident holders of land. Fortunately there are many places in the timbered region between the Atlantic and the Mississippi where it has not been found profitable to clear the lands for the plow, though very much has been so cleared off, which it were well to reclothe with trees for the sake of their climatic influence, as well as for their intrinsic value in the future, still there are, and will be, in that region uncultivatable lands enough that will never be cleared of their trees, which remain to benefit the seasons. Here, in the more favored fertile lands of the Ohio valley, it is otherwise, and we have yielded without thought of the future, to the temptation to exchange the forests for the corn field. Is it not already time to call a halt, to stop in this career of clearing the land, to preserve our trees upon all the broken and hilly and rocky country, more or less of which may be seen in every county of our boasted States of Ohio and Indiana.

In most places, where the lands have been long cleared and cultivated, so as to eradicate the germs of forest trees, it will be necessary to plant anew with seeds or seedlings, but this is really an advantage since it gives us the opportunity to select the more valuable kinds, and those best adapted to the particular soils and situations, or to the probable future demands of the regions. But when it becomes a question of the conservation and melioration of woodlands still existing, the expense is reduced to a minimun, as very little planting will be required.

The essential necessity in all cases is the entire exclusion of cattle from the woods we desire to improve. The so-called woods-pastures of our country are a mockery to the forest trees left standing, and, while these retain their vitality, the trees are a mockery to the blue grass that is vainly expected to yield its best results in their shade. All cattle, great and small, even our beloved and much honored *Poland Chinas*, *Chester Whites* and *Jersey Reds* must be rigorously excluded from the woodlands, under any penalty that the careful forester may choose to inflict. Fortunately for us, the woods are almost everywhere well stocked with young tree plants, ready to spring up and rapidly develop into a new crop, whenever the conditions of such a growth are presented to them; these conditions are in a great measure furnished by their inclosure with a good fence to exclude stock. A more successful preparation for the new growth, however, is the thorough clearing off of the present occupants by chopping them down, and this is best done in the winter season, because many of the stumps will throw up vigorous shoots, while also the smaller undergrowth, often of valuable species, will spring up, and the whole surface will at once become a dense thicket of young trees. In after years, but not too soon, the inferior kinds must be cut out as the space is needed by their more valuable neighbors.

Be not beguiled into a partial clearing away of the trees, leaving here and there a noble specimen of large size, or a promising young sapling. You will be disappointed in the result by either and both—the new growth will fail in the soil that is already mortgaged by the roots and shaded by the tops.

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of the old monarch, while the sapling, deprived of the shelter and support of its former companions, will succumb to the exposure, and miserably perish, or at best, it may struggle along for years and at last be surpassed by those little plants beside it that were scarcely discernable at the time of the clearing. By all means make a clean sweep of all the present growth; this as a general rule. The German foresters have an exceptional practice in their coniferous forests and in some of the deciduous kinds that have so densely shaded the ground as to prevent the germination and growth of young trees for the succession. In such cases they leave a certain number of the desirable species to furnish the seeds needed for restocking the land. These *mother-trees*, as they are called, are removed so soon as they have yielded a crop of fruit. After this has germinated, they are cut down so that the young may take an even start and grow together. This plan may perhaps be required in some exceptional cases, but there are few tracts of woodland among us, even those which have been somewhat pastured, which do not possess a sufficiency of young trees to furnish the needed succession, and it is an easy matter to make up all the deficiencies by planting and seeding with the kinds desired.

Some of you, no doubt, are thinking that this outcry respecting the destruction of our forests is without foundation, and that the supply for all possible purposes is really inexhaustible, and that it will ever so continue. Let them, if any such there be, look around as they cross the State, even by the rapid transit of steam, while passing over lands that furnished thousands of cords of valuable wood that were given up to the holocaust of the log heaps and where the fields are still encumbered by great stumps, the remains of a former tree-growth, they will see them requiring the protection of live fences grown from the maclura, and even of the foreign white willow and white thorn. They will also find that the country is no longer able to supply itself with the good old-fashioned rail fences, but is dependent upon the iron mines, and has recourse to the stone quarries for the posts upon which to stretch and support the wires and for fencing them. In some of the counties southeast from Indianapolis, formerly covered with heavy timber, may be seen stone posts, to which are spiked slight scantlings of two by four inches, and to these are nailed boards that have been transported from beyond the limits of the State. This does not look like an inexhaustible supply, within their limits at least; and all this is to be seen in the early history of your State, within the first century of its occupancy by civilized white men. We of Ohio are not a whit behind you in the race for destruction of our sylvan inheritance; spendthrifts, all of us. In the past decade we have diminished the area of woodlands in Ohio by more than four millions of acres. You may have done as much.

At the annual convention of Agriculturists, held in Ohio last January, one of the questions for discussion was this: *Has the Time Arrived in Ohio to Plant Trees for Timber?* To which affirmative answer was given in decided terms.

The similarity in the forestal condition of the two States may justify the repetition here of a part of what was then urged upon the land owners of the sister State. After a little exordium the writer took up the question Is it Time for us in Ohio to Plant Trees for Timber?

The answer was as follows:

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"Yes; yes, truly and most emphatically, my dear fellow-countrymen of Ohio, the time *has fully come* when we, the inheritors of this glorious possession, should, as a duty, plant trees for timber."

To which the mail brought prompt response from one of yourselves, "Yes! and Indiana too."

Certainly, we already have many warnings, that it is indeed high time for us to set about doing something toward the restoration of the forests which the necessities of agriculture and the advancing wave of civilization have so rapidly diminished within a century of occupation in extensive regions of the State.

The clearing of the land was a necessity for its occupation and application to agriculture. In this matter every landowner must be left free to decide for himself and for his own acres. No man, nor set of men, may let or hinder him from destroying or restoring his forests, nor can his movements be controlled by legislative enactments as in some other countries; the policy of our government is that of *non-interference.* * * * But we have a good democratic axiom, that the best plans are ever those which conduce to the greatest good of the greatest number of the people; whenever these are presented in acceptable form it is hoped and believed that such propositions will receive the popular support. So great is the American statesman's confidence in the general good sense of the people, and in their capacity for self-government, that all great questions may be safely left to the popular tribunal.

When new propositions come to be presented to the people, however, they may sometimes need a certain amount of educational training and enlightenment to prepare them for a wise decision. The theme now presented is, perhaps, one of that character to our fathers, and to many of ourselves, who have lifted up axes upon the thick trees and prostrated those princes of the forest which had for centuries reared their proud heads and reigned as monarchs of all they might survey. Those of us who have laboriously cleared the land of these incumbrances have triumphed in the unequal contest, and may well congratulate ourselves on having released the fertile soil from its forest thraldom to receive the vitalizing sunshine and to smile for us with productive farms and happy homes, surrounded with luxuriant fields of food crops for man's use, convenience and enjoyment. Flushed with our triumphs over barbaric nature, such may ask, "Why plant more trees and again relegate these smiling fields to the savageism of the forest times?"

Yes! this clearing of our fertile lands is indeed right and proper; it will go on, and it should continue for a *certain period* and to a *certain extent.* Whatever this limit may be, must depend upon so many circumstances connected with the physical conditions of a wide extent of territory, that the problem becomes difficult of solution, and requires for its proper consideration, a knowledge of many branches of natural history. It need not now be discussed, sufficient is it, that man's experience and observations in other regions of the globe will aid us in attempting a solution. From these we learn that one-fifth to one-fourth part of any considerable stretch of country, should be occupied by trees in order to produce the best results in the physical conditions necessary for the greatest productions of the soil, and for the highest development of humanity.

Yes, verily, my friends, it is indeed time that we were thoroughly aroused

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to the importance of this matter of the conservation of our forests. We should plant shade-trees and groves, shelter-belts and woods; yes, and where suitable conditions exist, we should also plant extensive forests for the sake of their future prospective but certain benefit to ourselves and to those who are to come after us. Why will we not learn from the experience of past ages, which is everywhere expressed so plainly in the history of nations, and impressed so manifestly in the *desert-scars* of the earth?

Let us take warning betimes, and begin now, and *at once* undertake the *preservation of our forests.* Forests are the conservators of moisture, the sources of the streams. "The tree is father to the rain" was a favorite saying of Mahomet. Then, again, we must remember that time is necessary for the production of trees. The botanists call these *perennial* plants, because they continue their existence *through* the years. Vegetables of this class do not build up their massy structures with the rapidity of fungi, some of which will evolve millions of their cells in a few hours, visibly enlarging while we behold them. Nor can the trees be compared in their periods of growth nor in the quickness of their cash returns with the familiar tillage crops of the agriculturist. The weeks and months needed for the production and perfecting of garden and farm crops are represented by the decades and centuries of years required for clothing the denuded surface with forest growths of mature and useful size. It is therefore high time for us to begin the work.

Be not discouraged, however. Trees grow fast enough. One of our classic writers, who fully appreciated trees, wrote: "Be aye sticking in a tree, Jack; it will be growing the whiles ye are sleeping." Those of us who are now past middle life, no doubt many of you now present, can point to noble trees that have grown within your own recollection; some of them, perhaps, were planted by your own hands. Strange as it may be, however, it seems nevertheless true, that old men, they who can not expect to see the result of their labors, nor to reap the fruits of their forest planting, are the most energetic tree-planters, rather than those who are just entering upon life, with a bright future opening up to their vision decades of prospective enjoyment, and with a reasonable expectation of life, comparable to the term necessary for the development of a useful tree. Old men are proverbially the *tree*-planters, everywhere.

In regard to their periods of development, there is a great diversity among trees, some have a brief rotation. The coppice growths of Europe are often utilized in periods of ten or fifteen years. In our own country we have many trees of short rotation, and some of our most useful and most profitable trees are of this character.

The Black Locust may be harvested after it has grown from twenty to thirty years.

The *Catalpa speciosa*, in the same period, will make good cross-ties and fence posts.

The Ailanthus very soon attains a useful size, and for certain purposes has been highly recommended, both in this country and Europe. Many years ago it was recommended for the arid plains of the southwest.

The forests of Scotch pine in Germany are allowed sixty years to reach their useful size for fuel and for construction timbers.

The Birch, there, reaches its maturity in about half a century.

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In our own land the Willow used for charcoal, needed in the manufacture of gun-powder, may be cut after growing twenty years, or even less.

Chestnut, in its second growth, is most profitably cut every twenty or twenty-five years.

The beautiful wood of the Wild Cherry soon reaches a profitable size for many purposes, though for saw logs and lumber the trees should be larger.

Many individual trees planted by the pioneers upon the broad plains of Nebraska, within the few years that white men have occupied the so-called American Desert, have already attained to useful size, and will yield each a cord of wood to cheer their owners.

Yes, my friends, the time has indeed come, when we, as a people possessing a full share of common sense, ought to realize the absolute necessity for devoting a portion of our energies and intelligence to the conservation and care of our sylvan treasures, and this will be followed by the planting anew the waste tracts and the untillable hill-sides, ravines, corners and rocky ledges, with suitable trees.

We should plant trees for ornament to the landscape.

We should plant them for shelter to our crops, our cattle and ourselves.

Trees should be planted to guard against failure of the water supply of the country.

Woods should be preserved for their influence in regulating the temperature and humidity of the atmosphere.

Finally, we should plant forests were it even for their use, and for the valuable products they yield for our consumption, in the multifarious demands of civilized life.

Yes, yes, truly and most emphatically, the time has fully come when you, the people of Indiana, should plant trees for timber.

DISCUSSION.

J. C. Ratliff. There is, apparently, a large amount of timber yet remaining in our country, but when we seriously contemplate the rapidity with which it is being consumed, we may justly feel alarmed. Even now, the most valuable of our native timber is gone. The giants of the forest have fallen. Almost every farm has its waste lands, which should be devoted to forestry. In the vicinity of Richmond, there are, perhaps, one thousand acres of comparatively useless land. If these lands were planted with valuable varieties of timber, what a mine of wealth it would soon be! The Catalpa is, doubtless, one of our most valuable varieties for timber purposes. It is easily grown from the seed.

W. A. Ragan. I am surprised that, in these talks on forestry, there is so little said in favor of the Red Cedar. It is a beautiful healthy tree, of medium rapidity of growth; forms a good shelter for stock and birds; as a wind break for orchards, dwellings, etc.,

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it has but few equals, and for durability of timber has no superior. I have a grove fifteen years old that will now make good fence, and even telegraph posts.

Dr. Brown. Perhaps our most valuable timber to grow is the Black Walnut. In addition to its rapidity of growth, its superiority as a timber, and its beauty, its nuts are worth as much per bushel as wheat. They are now worth $1.00 per bushel in Indianapolis. The Red Cedar does well on limestone soil.

Mr. Robison, of Illinois. We do not talk this subject as much as formerly in our Societies. We find it pays better to raise corn, which we can exchange, in the form of whisky and glucose for Indiana timber. (Mr. R. resides near the large distilleries of Peoria). Seriously, however, we do rely upon your State for much of our timber, and at the same time, we are, perhaps, expending more labor in our State in getting rid of our native timber than in planting groves. I think the cedar is over estimated for durability. The Osage Orange is good for posts, but not for ties. When I located in Illinois, timber lands were rated much higher than prairie lands. Now it is the reverse. We depend largely upon hedges and barbed wire, with live posts for fencing.

Mr. Beatty, of Kentucky. Posts made from old mature trees of Red Cedar are durable. I know of some sixty years in use and yet good. Young trees are not durable.

PLACE OF NEXT MEETING.

On motion, the Society took up the subject of the next meeting. After some friendly discussion, it was agreed to hold the next meeting in Muncie, December 20, 21 and 22, 1881. Greencastle being the leading competitor.

The reports of the Third and Fourth Vice Presidents were then submitted without reading.

REPORT OF J. W. RAGAN, THIRD VICE PRESIDENT.

To the President and Members of the Society:

In giving a report for the new third fruit district, which embraces fifteen counties in the central western portion of the State, I do it with the thought that it may not be strictly accurate, as the fruit crop was somewhat variable in localities, and especially apples. But from my own observation, and information received from fruit-growers, in different counties, I think we have had rather above an average crop, speaking of all kinds of fruit.

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It is surprising to see the indifference manifested by the majority of land owners in regard to raising fruit. Few of them ever think of planting anything unless it be gooseberries and currants, or perhaps a cherry tree or two which may serve as hitching posts, or for young George Washingtons to hack with a hatchet.

I have estimated that not one farmer in ten has a good bearing apple orchard, and not one of a hundred has a pear tree on the place. Such should not be the case. Fruit was perhaps the first food the human race had, and if every family could have all the ripe fruit they could use throughout the year in the green and preserved state, I venture the assertion that doctors would have fewer calls. Besides being both healthful and pleasing, to have fruit, does not cost the producer what some persons think. I am speaking of that grown for family use. Any one, with even a small piece of ground, may raise plenty for home use and often have enough left to sell to pay all the necessary expense of buying trees or plants, so that a small outlay of work and care is all that is required, and we might say the fruit is the gift of God.

But how few realize the situation. They say "it takes too long to raise fruit; we can not afford the time and ground." It is not necessary to become an horticulturist, or, as the word implies, skilled in gardening, to grow sufficient for home use; therefore, I say, plant every year or two, and bestow a little care occasionally, and yourself and children will be rewarded some time with plenty.

The crop of the past year has been one of unusual interest to the fruit grower. All kinds, from the "Sour Morello to the native paw-paw" yielding in proportion to the circumstances surrounding. The fruit, however, I believe has not been up to the standard in quality and all kinds disposed to rot badly, caused, no doubt, by the unusual season, being wet and cold in the spring, followed by dry, warm weather in summer and fall. Insects got in a full share of work, too, especially so on apples.

STRAWBERRIES.

The crop was hardly an average one. Although last winter was a mild, open one, strawberry plants did not go through as well as usual. They seemed to scald and turn brown, so they were not vigorous and thrifty in the spring. New varieties, as Captain Jack, Crescent, Cumberland Triumph, Champion, Monarch, Kentucky and others, have been tried, and in some places given satisfaction. The Wilson is still at the head of the list for profit. In Putnam county the summer has been too dry to grow good plants, so we need not look for much of a crop next year. However, we must continue to plant. Every family owning land should raise strawberries.

GOOSEBERRIES AND CURRANTS

Made a partial crop. Many persons destroyed their plants last year because of the currant worm. I think they were not so numerous this year. Diluted hellebore is the best remedy.

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RASPBERRIES.

The Black-caps made an average yield, perhaps above. The Mammoth Cluster berries not quite as large and perfect as common, but the canes were loaded. I was once very much wedded to this variety, but now say it must give way for the Gregg. Both kinds were treated precisely alike on the same ground, and the latter gave fully double the yield of a superior qnality. I unhesitatingly recommend it for general cultivation. Red varieties very little grown in the district.

BLACKBERRIES.

I find the Kittatiny and Lawton giving way to new varieties, as the Snyder and Wallace, which are reported as having done well in some places. Do not think the rust was as bad as usual. There was a good crop of wild berries in the southern counties, and so long as they answer the purpose people will not plant the cultivated kinds. This fruit, like the raspberry, I consider the cheapest small fruit for family use, and should be grown by every person owning suitable ground, which should be of a clay nature.

CHERRIES.

There was, perhaps, an average crop, the Early May taking the lead, it being the principal variety in cultivation. English Morello and Kentish Late are reported as having done well in Montgomery county. The curculio damaged late varieties considerably. Cherries should be planted on high, dry land to give good results.

QUINCES.

I have no information outside of Putnam county. Here there has been a good crop. It bore where there was a piece of a tree. My neighbor, A. M. Robinson, had about thirty bushels from forty odd trees of the orange variety. They were very fine, but ripened prematurely, and disposed to rot on the trees badly.

GRAPES

Have done very well, especially where vines were young and thrifty. For the northern counties, the Concord, Delaware, Anna, Hartford Prolific, Allans Hybrid, and a variety called "California," have succeeded well. I think it will not do to discard the Concord and Clinton for general purposes. It does not pay to grow grapes in this district for profit, but most families can grow what they need, and should plant a few vines for that purpose. There was very little mildew and rot, except on old vines.

PEACHES.

There was a half crop of not very good ones. A few early varieties like Morris's Red Rareripe and Crawford's Early produced some fine specimens, but the general crop was not so good. Summer too dry and hot. Native seedlings do best in a series of years.

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PLUMS.

We raised some plums notwithstanding the curculio, which was much worse than heretofore. The Wild Goose fruited in places and gives satisfaction. Damson greatly injured by the curculio. The Chickasaws, described by Dr. J. H. Robinson in last year's transactions of this society, gave best result in Putnam county, yielding in one instance an immense crop. Frost of May destroyed the bloom in some places.

PEARS

Produced well. The fruit was smoother than usual, but, perhaps, not as large. Bartlett and Flemish Beauty, the leading sorts, followed by Duchess, Stevens Genesee, Louise Bonne, Crassanne Bergamot, and a few others. There was a fair crop of the Duchess on dwarfs near Greencastle, many of the specimens being very fine. Not so much blight as in former years, in fact very little was seen. Trees have made very good growth.

APPLES.

The apple crop has been unsatisfactory to the producer; most varieties fell badly. Among summer varieties doing well may be mentioned the Early Strawberry, Early Pennock, Horse and Trenton Early; Maiden's Blush, Fall Wine and Fall Pippin, the leading fall varieties. A great many winter kinds were forced into fall ripening, as, for instance, the Northern Spy, Yellow Bellflower, Newtown Spitzenberg, and like varieties. The Ben Davis is decidedly in the lead for uniform good fruit throughout the district. The finest crop of apples I saw was this variety, on trees about sixteen years old, bearing near twenty bushels of good sized, smooth, well colored apples per tree. Saw very little twig blight with it, and heard of no trees dying; still I would not recommend planting exclusively of Ben Davis. Twig blight was very bad, affecting most varieties, especially the Hoops, Janet, Wagner and Sweet Janet. Varieties succeeding best are Ben Davis, Janet, Winesap, Newtown Pippin, Ladies' Sweet and Milam.

At the usual gathering time one-half the apples were off the trees and the remainder badly damaged by worms and rot, so that when our early winter set in but few persons were provided with a supply of good apples. The Northern Spy and Grimes Golden fell off long before time to pick apples. The question arises, how are we to save our apples under such circumstances? But we must continue to plant and not become discouraged.

Fillmore, Ind., December, 1880.

SPENCER, OWEN COUNTY, INDIANA, Dec. 14, 1880.

John W. Ragan, Committee on Fruit:

Yours containing inquiries as to fruit crop, etc., received during my absence—since my return home, I have centemplated attending the meeting, but I find it impossible to he absent from home at a season of the year when my family have a reunion annually. I can hardly hope to ever meet the society any more on the above account.

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"The general fruit crop" has been such as to hold out a sickly inducement to cultivators in a general direction. Every kind did something, but no kind remarkably—hardly passably well.

"What apples have done best?"

Not a single specimen free from injurious blemish. R. Janet and Ben Davis best, Wine Sap next.

"How was small fruit, especially raspberries?"

Strawberries full crop, hurt by rains. Raspberries ditto. I hardly know how to say more on the subject. Prices were too fluctuating at Indianapolis to guide in harvesting fruit. Too hot for currants. Gooseberries fine. Killed the pesky worms with hellibore diluted.

"Do pears do any good in Owen county?"

Yes, after the fashion, I really had more pears than apples off the same number of trees.

"Was there a full peach crop on the hills?"

No. Peaches were scarce and inferior. I doubt our ability to supply our wants.

"Any cultivated blackberries growing about Spencer?"

No.

"Are grapes cultivated for profit?"

But few, and the return does not encourage any one.

I think it the duty of farmers, and, in fact, all householders, to plant and care for fruit trees and vines to a limited extent, for heathful pleasure and hoped for profit. I would recommend no one in this county to plant any thing in that line however for market purposes. Fish ponds pay better for family use. With regards to all,

C. FLETCHER.

REPORT OF E. Y. TEAS, FOURTH VICE PRESIDENT.

The fruit crop in the fourth district the past year is believed to have been an average one. I have not personally visited every part of the district, and have had to depend in part upon reports of others. The apple crop was above an average, and the quality was better than we sometimes have, as the fruit was rather larger and fairer than usual, and less injured by insect enemies. I am sorry, however, to believe that this crop does not yield the growers the profit that it might. It is comparatively an easy matter to plant an orchard and bring it into moderate bearing. But now the battle is but half won; it requires more labor of head and hand to care for and market the fruit than to rear the orchard. In my own neighborhood thousands of bushels of apples, many pears and some peaches, rotted under the trees, because the growers had not made provision for the disposal of them. Such a state of affairs ought not to be, as there is generally a market within reach where good fruit can be disposed of at some price if offered in tasteful packages. I believe that experience teaches that the manufacture of cider vinegar for market is an uncertain business, so far as profit is concerned, and also that a temperance man can not properly manufacture cider for drink-

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ing purposes. So that a profitable use of apples by manufacturing them into cider is cut off. It may be that in time the value of evaporated fruit will be generally appreciated, and as apparatus for its preparation is perfected, this may become an available means of utilizing surplus fruits. I am not sure that this end has yet been attained. Owing to the excessive heat during part of last October, fall and winter apples rotted badly. Those in cool, well ventilated cellars or fruit houses fared the best, and I am convinced that by early picking and storing in rooms where the circulation can be easily controlled, such varieties as Maiden's Blush, Rambo, Fameuse, Grimes, Golden, Northern Spy, and in fact nearly all of our fall and winter varieties of apples may be kept successfully and profitably until late winter or spring, the simple requisite being a tight room that may be filled with cool air during the coolest part of the night, and then tightly closed until another cool night allows it to be again ventilated and cooled. In this way apples and other fruits may be preserved in good condition many months beyond their usual season. Picked winter apples brought 25 to 30 cents per bushel at the orchard. Pears were a fair crop, and sold at 50 cents to $1 per bushel.

Peaches were a full crop where there were trees large enough to bear. There have not been many peach orchards planted in this district for several years past, and the trees that could bear were scattering and scarce. Still a great many bushels were marketed at fifty cents to $1. Some of the early varieties, Amsden's June, Alexander, Honeywell, etc., fruited for the first time in this section, and were very fine indeed.

I have seen nothing better among early peaches than Honeywell, a most beautiful white fleshed peach nearly entirely covered with dark red. It ripened in July. Many specimens were six and a half to seven inches in circumference.

Plums are not grown. Quinces did well where there were trees of bearing size, and the fruit was in demand at high prices. I am at a loss to account for the scarcity of trees. The Orange Quince is the variety usually grown. There was a good crop of cherries, Early May or Richmond, is the variety relied on. English Morillo does well, and is superior to E. Richmond for canning. The common Red Morillo did well the past year as also some of the Dukes and Sweet Cherries.

Grapes did well generally. Concord is the leading kind, though quite a number of others are in bearing, Martha, Lady, Brighton, Worden, etc. Moore's Early has been planted and will give us fruit another season. Lady Washington, Prentiss, Jefferson and other high toned candidates are on trial. Thus far I consider Brighton the best American grape I have seen. Moore's Early is increasing in favor.

A gentleman just north of the boundary of my district informs me that he marketed a few tons of grapes, Concord, Martha and Lady, principally; that he sacked all the clusters and girdled the vines generally, and by these means so increased the size and quality of his grapes, and their earliness also, that he obtained about ten cents per pound wholesale for his entire crop.

It seems to me the testimony is almost universally favorable to sacking the clusters of grapes, and by this simple process we may again have Catawba,

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Diana and other fine varieties regardless of mildew, birds or bees. I presume, however, the English sparrow, true to his villainous instincts, will soon learn to tear up the paper bags, and their usefulness thus be destroyed.

Gooseberries and currants were a failure generally, owing to the ravages of the currant worms. I think this enemy can be successfully destroyed, but the average cultivator has not yet fully made up his mind to take the necessary steps for its destruction. Then we may expect these to be among our most reliable and valuable fruits.

Of blackberries Snyder and Taylor's Prolific were the most profitable. Kittatiny and Wallace were also fine.

RASPBERRIES.

Turner is probably the most popular red berry that has been well tested in our locality. Thwack and Brandywine are fine. Herstine is a splendid berry, but the plants require winter protection. Reliance has not done well on my grounds. Cuthbert produced a few handsome berries the past season, and we have hopes that this will become a leading variety.

In black raspberries Gregg takes the lead in size, quality, productiveness and for market requirements. Mammoth Cluster and Canada Blackcap are also profitable sorts. These are much alike, but are distinct, and the Canada is probably the best of the two, the berries being a little larger, more uniform, a little later and the plant more hardy.

Miller's Daily is decidedly superior to Doolittle, ripening about the same time. The berries are much larger, of better quality, and the plants are equally as productive.

Kentucky has not been fully tested, but it is believed to be not worthy of adding to our list.

Florence is a salmon-colored cap variety, that I believe will endure more cold than any other variety I have, and produce more bushels per acre than any other kind. It propagates only from tips.

Strawberries, though last on the list, is one of our most important fruit crops, and although its culture is extending from year to year, the demand for the berries seem to fully keep pace with the production. It is surprising how the demand for fruit in the small villages, and even in the country, has increased within the last few years. All classes of our citizens consume much more fruit than twenty years ago, and are the better and happier for it. The varieties of strawberries are so numerous and the opinions of cultivators so conflicting as to comparative value, that I do not wish to give a list of best kinds. Soil, situation and culture have much to do with the product of a strawberry bed.

The crop the past year was about an average one, and the prices realized were reasonably satisfactory. The varieties mostly cultivated are Wilson's Albany, Green Prolific, which should be superseded with Champion, Charles Downig, Kentucky, Captain Jack, Crescent Seedling, Cumberland Triumph, and Monarch of the West.

On motion, the Society adjourned to meet at the college at 7:30 P. M.

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EVENING SESSION.

At 7:30 o'clock P. M., the Society reassembled as per previous arrangement, in the chapel of Wabash College. After an exhibition by Prof. Campbell, of the electric light, President Johnson resumed the chair.

Secretary Ragan called attention to the organization, in September last, of the Mississippi Valley Horticultural Society, explaining that, under the constitution adopted, each State Society was authorized to elect a Vice President. This being so, he placed in nomination the name of C. M. Hobbs, who was duly elected as Vice President from this State.

Prof. Burrill, of Illinois, being present, was then introduced, and proceeded to deliver a highly interesting address on

BLIGHT, OR BACTERIA-FERMENTS IN FRUIT TREES.

The fire blight of pear trees and the so-called twig blight of apple trees are caused by *bacteria* gaining access to the cells of the bark and leaves, through some injury to the outer coating, and producing butyric fermentation of the starch stored in these cells for the food of the tree. The demonstration of this assertion constitutes the object of the address upon which we enter.

Blight, especially of the pear tree, has been known on this continent more than one hundred years, and has been extensively studied and discussed. No other theme has been so often before horticultural assemblies, yet no discussions have been so unsatisfactory as to their results. Scientists, editors and practical cultivators have been obliged to acknowledge that the cause remained unknown, in spite of the many conclusions reached upon observation, or more often upon theoretical considerations. Among the causes assigned have been insects, freezing of the sap, improper nutrition through some lack in the required ingredients of the soil, constitutional degeneration, etc. These and many other notions of similar import were, by larger observation and experiments, so thoroughly disproved that speculation quite generally turned to the obscure vegetable parasites classed among fungi. It was boldly asserted that the disease was proved due to the agency of fungous growths, and in one case the specific fungus to which the malady was ascribed was described, was figured and named.* But it is safe to say that no one recognized as active agents of the disease, if, indeed, any one ever saw, the real living organism to which your attention is now asked, until very recently, and until pointed out by myself.

In 1877, while closely examining blighting limbs of pear trees for any of the ordinary parasitic fungi, I noticed very minute living organisms in the

*Dr. Salisbury, Transactions Ohio State Agricultural Society, 1863, p. 450.

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semi-fluid materials of the affected tissues, and without at the time comprehending what these minute things were, the account concerning them was communicated to the Illinois State Horticultural Society and published in the transactions.* During the summer of 1878 the same organisms were again observed, and being examined with a better microscopic objective, were pronounced bacteria, and seriously suspected of being the cause of the disease.† But the real study of these creatures, in connection with the death of the trees, was begun June 30, 1880, and continued without interruption until August 14 of the same year, ending at this time with the positive conviction that they were, and are, the long-sought enemies of this favorite fruit tree.

To those not accustomed to work with the compound microscope, and not specially informed upon the subject, it is not easy to convey by words a good idea of what *bacteria* are. They have been variously classified as animals and as plants; among the latter even botanists disagree as to whether they should be called Algæ or Fungi. The Algæ include a very large number of low species of vegetation, mostly inhabiting the water. Those in the oceans are known as sea weeds, while the green scums on standing water and the silken threads of green attached to stones, etc., in running streams are good common examples of this great division of flowerless plants. Fungi include a still greater number of specific forms and perhaps vary among themselves more than the algæ. They are for the most part inconspicuous plants, but among them every one knows what he calls mushrooms, toadstools and moulds. Fungi never have a true vegetable green color; they can only subsist, like animals, on organic food, hence are parasites on living plants and animals or grow upon their decomposing remains.

The bacteria agree with the algæ in inhabiting water or other fluids, and with fungi in color (white), and in their mode of nutrition (organic food.) Perhaps they should be treated as a separate class of plants lower than either true algæ or true fungi; but there is no longer reasonable excuse for assigning them a place among animals. Many of the species possess the power of very agile movements, but it is now well known that multitudes of undoubted plants (mostly microscopic) move as freely from place to place as do animals, and that higher plants have more or less spontaneous movement of their parts. The power to move no longer separates animals from plants.

Wherever the bacteria may be classified, no living things are more commonly and widely distributed over the earth. They are always very small; so small that their existence could not have been known without powerful magnifiers. Though all are minute they vary much in size so that it requires to see the smallest the very best microscopes which modern ingenuity has devised. Indeed, it is now supposed that the germs of some kinds are invisible under the highest and sharpest powers we possess. But they make up in number what is wanting in size, and by their ceaseless activities become exceedingly important agents in the great operations of nature. They are closely allied to the yeast plants, and like the latter cause peculiar decomposition in organic substances. Yeast causes alcoholic fermentations, made

* Transactions Illinois State Horticultural Society, 1877, p. 144.
† Same, 1878, p. 80.

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use of by man in the manufacture of wine and beer and in ordinary bread making. Bacteria cause putrid and other decompositions also classed as fermentations. We formerly supposed that the fleshy parts of animals and plants naturally decayed by mere contact with the atmosphere. The common idea that prevails in reference to preserving fruits and meats by canning is that this process excludes the *air* and by this means directly attains the end. Those who have carefully studied the matter, however, know that it is not the air, but the *germs of living organism* which must be kept out if success would be attained. Indeed, the most putrescible materials, as blood, yolks of eggs, infusions of vegetable substances, etc., can be indefinitely preserved by putting them into a vessel having a long neck turned around so that its open end is directed downward, then boiled to kill the organisms already present upon the sides of the vessel, etc., and set away to remain perfectly still. There need be no sealing or closing in any way the small opening of the neck; the substance experimented upon has free access to the air, but may remain for years perfectly fresh and sweet. If, however, the vessel is shaken so as to cause currents in and out of air, carrying with them the floating germs, fermentation at once ensues. This may seem to be an improbable statement to those who know how careful they must be in hermetically sealing fruit jars, but it may be confidently asserted that no fruit ever spoiled without the presence and active agency of living organisms. In some localities, as upon the great sandy plains of the West, fresh meat may be freely exposed to the open air in summer without fear of putrefaction, because there is over such wide areas so little vegetable or animal matter upon which the minute organisms live that they or their germs are not usually present in the air.

We can gain some appreciation of the importance of these minute things which we call bacteria, when we comprehend that they are the chief agents of all the rotting, putrefying, souring and other processes of decomposition which takes place on the earth. But for these, the contents of an egg would no more decay than so much gold, and neither milk nor the juice of apples would become sour.

There is, however, another reason for calling attentions to these bacteria. Within quite recent times, they have been proved to cause *disease* in man and animals. In 1850 a minute species was detected in the blood of cattle in Europe, suffering with splenic fever or anthrax. But little attention was paid to them until in 1861, an account was published of investigations upon ordinary fermentations caused by similar organisms, when Devaine, of Paris, the original discoverer, and others undertook to ascertain the relations of the bacteria in the blood to splenic fever. The results were overwhelmingly conclusive, and indisputably showed that the minute organisms *caused* the disease. This is but a type of contagious diseases in general. It has not been absolutely proved to the satisfaction of all able physicians that small-pox, scarlet fever, cholera, yellow fever, diphthera, typhoid fever, etc., are always due to such organisms, but known facts, strongly imply that this is the case. So-called hog cholera, as shown by the admirable work of Dr. Detmers, of the Department of Agriculture at Washington, as well as by Dr. Law, in the same reports, is certainly caused by a bacterium. I was permit-

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ted to examine, time and again, the virus used by Dr. Detmers in his inoculations of pigs, and followed closely the results, hence, can personally testify to the correctness of his reports.

Surgery too has been greatly benefited by the use of the microscope and the doctrine of disease germs. The application of carbolic acid and other disinfectants to wounds is for no other purpose than to kill the minute organisms which interfere with healing. Surgeons now operate with knives, lancets and probes, which have been rapidly passed just before through a flame, and have a spray of carbolic acid playing upon and around the wounds during the time of their work, and until bandages are applied.

With so much established upon the action of bacteria on animals, we now turn to the evidence of their agency in causing diseases of plants. Some work in this line has recently been done in France by M. Van Tieghem, showing that numerous plants are affected by them; but no one besides myself has, to my knowledge, attributed any of the important diseases of cultivated plants (crops) to the agency of bacteria. A distinction must be made between *fungi* in a general sense, and *bacteria*, a class of the former. Multitudes of parasitic fungi prey upon useful plants, doing more damage than all the injurious insects; but those heretofore known to thus destroy our crops are as different from bacteria in appearance and mode of development, as trees are different from pasture grasses, or as corn in the field from the moss on the old oaken bucket.

The bacteria, to which the pear blight is attributed, is so minute that a magnifying power of two hundred diameters (not areas) is required to see them, and five times this power is needed to study their shape and mode of propagation. They are composed of cylindrical cells obtusely rounded at the ends about one and a half times as long as wide. Two such cells are very commonly connected, end to end, but at the same time many single ones, and perhaps as many in strings of four or more, may be seen. Their transverse diameter is about one twenty-five thousandth of an inch. With a magnifying power of one thousand times (in length), the apparent length of two joined cells is just about one-eighth of an inch. A book before me has about four hundred pages or two hundred leaves to an inch, hence one hundred and twenty-five of these organisms, laid side by side, would make up the thickness of one sheet of the paper. Though so small, one is not surprised that important results may be accomplished by them, for their numbers are totally beyond our powers of estimate, even in the smallest appreciable quantity of the material. A speck which we can barely see upon the point of a needle, put into a small drop of water on a slip of glass, examined with a microscope, reveals thousands of the bacteria. They multiply, too, with rapidity. This is done by growth in length, one cell becoming long enough for two, and by subsequent division crosswise in the middle, so that one cell really becomes two. If they separate, as all may, we have single cells; if they remain attached, strings or chains are formed. It has been ascertained in some other species that within the cells, small as they are, under some circumstances, several bodies, almost invisible under the highest powers of the microscope, are formed, capable of growth after their escape,

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into the ordinary bacteria cells. This has not been observed in the species from the pear tree, though it may occur.

Having found in the tissues of blighting trees these bacteria, and found them in every case when the disease was in progress in some hundreds of examinations, the question occurred, do they *cause* the blight, or are they the result of a preceding diseased state of the parts? To determine this important point a series of experiments were performed, resulting in *establishing the active agency of the bacteria in producing the disease.*

These experiments were as follows: Some of the sticky, semi-fluid substance which oozes from the bark of blighting pear and apple trees, like pus from a flesh wound, was diluted with distilled water until the liquid appeared like a mixture of five to ten parts of water to one of milk. This sticky material is almost purely composed of the bacteria, so that in the least drop of our solution there were great numbers of them. Inoculations were made by dipping a needle or sharp pointed knife into the watery fluid (called virus) and puncturing the bark of healthy trees. Usually to make it more certain that some of the virus reached the inner cells of the bark the instrument was the second time wetted and thrust into the same wound. In some cases pieces of bark from a blighting tree were inserted after the manner of budding in healthy trees. Sometimes the parts in either case were immediately bandaged to prevent the access of any other destroyers, and sometimes similar punctures were made with a clean instrument as a check upon the former. In other experiments the virus was applied to the uninjured surfaces of limbs, and to leaves selected as whole and fresh. The experiments were numbered from one to sixty-four, one number sometimes indicating a single inoculation, but usually from three to ten. Records were made daily during forty-six consecutive days, from June 30 to August 14, 1880.

The result showed sixty-three per cent of the inoculations upon the pear tree were followed by blight having all the characteristics of that arising naturally in the trees. Thirty per cent of the inoculated apple trees blighted, and of four inoculations in quince limbs all died with the same malady. An interesting result was that of virus taken from blighting apple trees (twig blight) and inoculated in pear; seventy-two per cent succeeded, while but fifty-four per cent of those with pear virus in pear produced the disease. This clearly shows the identity of the disease in the two trees, but the greater apparent virulence of the apple virus may have been due to other causes. Of the applications to the surfaces without puncturing none were followed by the blight, neither did the disease occur in any case from punctures with a clean needle. There were seventy-three pear trees three years old, fifty-four of which were in rows two feet apart, and the others near by in the lot upon which the experiments were made. There were other pear trees of larger size, and about twenty apple trees. From the latter several small limbs were cut away from time to time, having blighted without inoculation by myself. In the three-year-old pears, Bartlett's and Clapp's Favorites, upon which the inoculations were mostly made, blight occurred spontaneously only in a single case. Thus in the pear, while sixty-three per cent of those inoculated became diseased, but little more than one per cent blighted without inoculation. Can anything be more conclusive? May we not fairly hold that the inocu-

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lation with the bacteria *caused* the disease? Because of the failure of all the experiments in which the virus was applied externally it ought not to be concluded that it is always impossible for the disease to thus occur; but it seems to me quite conclusive that danger is much greater when the epidermis or the outer corky layer of bark is ruptured.

If we now inquire how the disease occurs in nature, scarcely anything but speculation can be advanced. It is thoroughly positive that the bacteria do not arise spontaneously in the tissues of the tree, neither do they gain entrance with the water absorbed by the roots. Indeed, the latter are always free from blight, unless the disease follows down the stem, in which case the bark of the large roots may become involved. This in itself is a capital point to which the attention is invited of those who ascribe the blight to the defects of the soil.

When the blight occurs as it often does on the trunks of both pear and apple trees, it commonly begins at a wound made by pruning or otherwise, or in a knotty, rough portion of the bark. The southwest side is peculiarly liable to the disease, but it may originate upon any side. It is well known that the trunk borers (insects), prey most upon injured parts with uneven surfaces, and it is not improbable that these enemies of the trees become still worse foes by admitting the blight bacteria. But cracks may occur by expansion of the trunk through the unyielding dead coating of the living bark, and this will be the more likely the thicker and rougher the old bark; hence inoculation of these old parts may take place without the pruner's knife, the plowman's singletree or the borer's attack. But in the younger parts covered by an elastic epidermis or layer of recently formed cork cells, some rupture must probably be made by something outside of the tree itself. Doubtless insects of various kinds most often may be charged with the offense. As before remarked the bacteria themselves, are sticky; their outer surfaces adhere to each other and to other objects with which they come in contact. This, while preventing them from dispersion in the air, just fits them for distribution upon the feet and mouth parts of insects which pierce the protective coatings or creep over wounds otherwise made. Thus insects, after all, probably are partially responsible for the blight.

There are a few birds which make wounds sufficient to introduce the bacteria. The little speckled woodpecker, called sap sucker, certainly does this, and some others pick off or out the buds of trees in such manner as to expose the fresh, inner tissues. Rabbits and man probably complete the list.

How the bacteria become disseminated through the tissues, after first introduction, is not clear. Nothing can be more certain than the impossibility of their being carried by the circulation of the water or sap in the tree. Those who have made assertions of this kind in connection with the spores of parasitic fungi, know little of vegetable anatomy and physiology. Small as the bacteria are—much smaller than the spores of any other fungi—they must meet in impassable barrier at every cell wall, unless by their own powers of movement, they can urge their way through, perhaps after dissolving sufficiently the cellulose substance of the wall. In the cells of the bark, in which they are found, there are no openings, which the highest powers of the

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microscope reveal, yet water passes readily through the walls. Possibly, the genus of the bacteria—not known to exist in this species—may be so small and so plastic, that they can get through, just as the white blood corpuscles traverse the walls of our own "impervious" veins. But the observed fact that the bacteria do slowly spread in every direction from the point of inoculation, conclusively proves that they do, in some way, penetrate these closed cells. That they do not easily pass the cell walls is shown by the slow progress they make, rarely more than an inch per week in one direction, and never in my observation, more than an inch per day in the youngest tissues.

The bast cells, forming the fibrous inner bark, are never affected by the bacteria. These cells have very thick walls, which, while readily absorbing water, effectually resist the penetrations of the organisms. A continuous layer of bast cells seems to be a perfect barrier to the progress of the destructive bacteria. Such a layer not unfrequently separates diseased and dying parts from that perfectly healthy; but communication may take place through the medium of the medullary rays which traverse the fibrous bark as well as the wood.

The apple, pear and quince are not the only trees which suffer from the action of bacteria. They, in a similar manner, destroy the Lombardy poplar, gaining access in this case by bark-boring insects. The tremulous leaved poplar, or Aspen (populus tremuloides), blights very much like the apple tree. I do not know, however, whether the bacteria from either of these trees would, by inoculation, communicate the disease to the pear or apple. They appear very much like the pear bacteria under a powerful microscope.

The disease known as the yellows in peaches, is of similar character. The bacteria, so far as examined from the diseased peach, is, ordinarily, a little longer than those from the pear, about three and a half to three. They, too, work in the bark, leaves and fruit. None have been found in the roots of trees whose tops were dying. But my opportunities for studying this disease have not been favorable ones. No doubt, whatever, the whole course and character of the disease could be made out by proper investigations.

The first and notable effect that the bacteria have upon the cells which they invade is to decompose the granules of starch contained in them. The cell walls are not in the least effected, except it may be in the youngest tissues which shrivel up after the effects of blight. The protoplasm does not disappear from blighting cells until death takes place. It may, however, be injured so as to interfere with its physical functions without showing change under the microscope. A not uncommon fermentation, the products of which are butyric acid, carbon dioxide and hydrogen, always the result of bacteria, is set up in the starch. A few pieces of diseased bark, in which the organisms are still active, placed in a stoppered bottle with water in a temperature of 70° to 90°, soon show by the bubbles which rise to the surface the progressing fermentation. In a few hours the liquid becomes frothy, and, forcing out the stopper, foams over the top of the bottle.

A few words about remedies must close this account. From anything so far found there is no certain prevention or cure. The facts ascertained and now recapitulated rather tell us what we need not do rather than what to do. We need not first of all blame the soil, nor need we expect by doctoring it

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or the roots to cure the disease. We need not place any dependence in any particular method of treatment or culture save such as are of best use to the tree irrespective of blight. We need not think an application of sulphurous or any other washes applied to the trunk only will protect the whole tree.

The proceedure and treatment now recommended are to select the hardiest varieties, to plant and cultivate these so as to secure the healthiest, smoothest growth, taking special care that the soil is sufficiently drained in springtime, and that the trees are not severely injured by summer drouths, and that the wood is ripened early in the season. A wash once or twice per year applied to the trunk and the branches as far as possible of strong lye from wood ashes, or an equivalent solution of concentrated lye or crude potash, will keep the bark clean and smooth, and so reduce the liability to blight as well as permit one to see very early the commencement and progress of the disease. It is also thought such a wash renders the attack of insect borers less liable, and if so, as pointed out above, must reduce the liability to blight. Perhaps some anti-septic material, mixed or not with lime wash, is worth applying to the trees. If trying these carbolic acid solution, two parts of the pure acid to one hundred of water, would come first in my selection. Linseed oil has been much recommended, and also condemned, but is certainly worthy of further trial. It, if evenly spread, would form an elastic coating to the bark, not easily ruptured, and thus be protective and preventive of blight.

But dependence after all must be placed in careful and prompt excision of the diseased parts. The slow progress of the bacteria through the tissues should give us much faith in the possibility of saving the trees by close attention. We must not wait for the death of the leaves to indicate the presence of the destroyers. These remain green oftimes for days, weeks, or even months after the bark from which they spring, or upon older parts, is diseased beyond recovery. A peculiar brownish and watery appearance of the smooth bark shows within one or two days after the cells beneath are affected, and the slightest shaving of the outer layers of bark reveals the work of the bacteria, though only a few hours have elapsed since they began. Limbs may be cut away entirely, or the largest parts may be shaved so as to take away a part of, and all outside of the fibrous layer of bark (liber). Then after washing with the above carbolic acid solutions the wound should be covered with oil or paint, or, better still, with paper or cloth bandages previously oiled or permeated with parafine.

DISCUSSION.

W. A. Ragan. Prof. Burrill has made a strong argument from his standpoint, but there is another side to this question. While all he has said is true of twig blight, it is not true of fire blight. In this case the disease is carried up through the wood. It appears in the top of the tree. This is true in every instance. Twig blight, on the other hand, invariably proceeds downwards. He has made this question so plain from one side, I fear I will not be able

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to convince you that there is another, but there is. The microscopic objects he describes so minutely as *bacteria*, are not the cause, but the result of the disease. Do we not find this the case in all decaying bodies? The apple tree borer is not the cause, but the result of disease. The parent insect is guided by her instinct in selecting a place in which to lay her eggs. The fire blight is a vegetable poison. The twig blight is caused by an insect. It deposits a small drop of brownish fluid on the point of the twig that kills it. You can sometimes see the same deposit on the calyx of apples. I have investigated this subject carefully, and I know I am not mistaken.

Dr. Brown. In 1872 we had at Washington peach trees that had the yellows. Prof. Taylor, microscopist, investigated and found *bacteria*. The roots were not affected. We saw no means of destroying them. I think them vegetable, and have their origin in spores.

Prof. Coulter. I commend the work Prof. Burrill is doing. I should like to inquire if these bacteria are found in connection with starch?

Prof. Burrill. I think not.

Prof. Coulter. Bacteria are made up of protaplasm. May they not be propagated through cell walls?

Prof. Burrill. I think it quite impossible.

REPORT OF E. Y. TEAS, DELEGATE TO THE KENTUCKY MEETING.

When I left home in eastern Indiana, on the 13th of January, 1880, to attend the Annual Meeting of the Kentucky State Horticultural Society, the ground was covered with about four inches of snow, and the day bright and pleasant, for midwinter. As I rode along by the way of Indianapolis and Jeffersonville the depth of show continued near the same. I reached Louisville about ten, P. M. Next morning when I arrived at the depot I found J. Decker, secretary, and other menbers of the State Society, bound for the winter meeting. A few miles out from Louisville, the train stopped and Hon. T. S. Kennedy, president of the society came on board. At Anchorage Messrs. Goar, Walker and others joined us. At Simpsonville, Hon. J. S. Beatty, treasurer of the society, came in with his baskets of fine fruits, and his bags of dollars. So that by the time we reached Shelbyville, the place of meeting, we had not only the officers, but also the material for a first-class horticultural meeting.

The country passed over from Louisville to Shelbyville, some twenty-five miles, is rich, rolling land, resembling Putnam county, Indiana, as much

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as any section I think of. The farms are generally pretty well improved. The raising of horses, mules, cattle and sheep appeared to be a leading business. The fields in this section have many of the original forest trees standing, which is unusual in Indiana, and this I think adds much to the rural beauty and attractiveness of the country, and doubtless to the comfort of the herds in summer also.

Orchards are not very numerous or extensive in this part of Kentucky, and I thought those seen from the train were not more thrifty or healthy than the average in our State. The snow in this part of the State was nearly as deep as in Indiana, and considerable complaint was being made of the severity of the winter.

Shelbyville is a fine old town, the county seat of Shelby county. I think much such a town as Danville, Indiana.

The Society met in Layson's Hall, where your delegate was cordially welcomed and kindly treated during the several sessions of the convention. I found the members generally men of experience in horticulture, and earnestly and intelligently seeking to promote horticultural progress in their State. Hon. T. S. Kennedy is a veteran fruit-grower, who has devoted much of his life to rural pursuits, and has for many years presided over the meetings of the State Society. In his annual address he recommended the formation of local horticultural societies in every county or neighborhood in the State. The president of each local society should be ex-officio a member of the Board of Managers of the State Society, and should be required to report the transactions of the local societies to the Board. This, if carried out, would diffuse horticultural knowledge throughout the State, and add much to the usefulness and interest of the State Society.

J. S. Beatty's essay, "Horticultural and Tree Frauds," shows that our Kentucky neighbors are not strangers to the wiles of the irrepressible "tree peddler." They seem to have suffered badly, first from the operations of northern canvassers, and after being thoroughly done for by these scamps, the plague assumed a different shape. Other more ill-favored and unscrupulous members of the same clan came from the South, and set up great claims for southern-grown trees, southern varieties, adapted to the southern climate, and also the fact that southern enterprise should be encouraged by southern citizens, and thus enable these champions of the South to drive out the northern tree peddlers who had so shamefully swindled the dear people. This trick took well, and immense quantities of northern-grown trash was disposed of under the claim of being grown in the South. The result, if possible, was more discouraging and disastrous than before.

I was surprised to find that fruit growers in this part of Kentucky appear to suffer as much or more from injury done to their orchards by cold winters and by insect enemies as we do in central or northern Indiana. This is true in regard to both apples and peaches. One report said: "Peaches.—Our heart beats very slow when we come under this head. For five consecutive years we have had no peaches of the finer varieties;" and this sentiment seemed to accord with the experience of most cultivators present, except those occupying the most elevated positions, as Muldraugh's hill, etc.

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The essay on Peach Culture, by Hon. W. J. Lee, covered the whole ground, from the selection of the trees in the nursery to marketing the fruit in the northern cities, and was the best practical treatise on the subject I have ever heard, and shows that Mr. Lee is as well fitted to instruct in horticulture as to shine in legislative halls. Mr. Lee occupies a very desirable location on Muldraugh's hill, at Pitt's Point, and, in addition to his very extensive peach orchards, is a large cultivator of native plums of the best varieties. Wild Goose, DeCanduroc, Newman, and others of the Chickasaw family, are very profitable. For the fruit of these a ready sale is found in Louisville at prices that render their culture much more profitable than peaches, even where the latter succeed admirably, and also regardless of the fact that expert judges have decided that all the Chickasaw family of plums are vile and vulgar and unfit for human food.

Pear blight came in for a share of attention. The linseed oil remedy was recommended and endorsed by a number of the members.

"Hardy Grapevines for Kentucky" was the subject of an essay by Bennett H. Young, of Louisville. This showed the writer to be well versed in grape-growing. Mr. Young placed Concord at the head of the list, as the grape for everybody, and Worden, a Concord seedling, as next. He says: "Some of the bunches of Worden weighed nearly two pounds each, and the quality considered by some nearly equal to Black Hamburg, grown under glass. Rogers' Hybrids are not hardy on Mr. Young's grounds. The other hardy black varieties named were Moore's Early, Ives' Seedling and Norton's Virginia. Red grapes—Delaware, Perkins (very good), Catawba and Brighton. White grapes—Martha, and Elvira (a wonderful grape, considering its abominable parentage. It is a seedling from Taylor's Bullitt.")

Protecting grapes from birds, insects, mildew, etc., with paper bags, was also advocated by Mr. Young. He says: "Last year I put on about two thousand paper bags. The results were most satisfactory. The grapes ripened evenly, with the best of coloring, fully as early as those not enclosed, and with a superb flavor. More than this, the bunches come out of the bags with a splendid bloom, and as perfect every way as it is possible for a grape to be. In this part of Kentucky, between curculio and birds, there is little fruit left to the grape-grower. These bags are absolute protection from both, and their use is neither tedious or expensive."

A paper on Wine Making, by C. S. Jackson, of Danville, Kentucky, developed a lively interest in this subject by the members present, and numerous statements that Kentucky was peculiarly well adapted to the production of wines of the best quality.

S. L. Goar, of Anchorage, in his essay on Pears and Pear Growing, mentioned the Chambers as the most valuable pear for Kentucky. It was introduced into the State about fifty years ago, by Mr. Chambers, from Maryland. It has thus far been entirely exempt from blight. Young trees are about ten years coming into bearing, but are then regular annual bearers. The fruit is medium to large, a rich golden yellow, thickly covered with gray dots, and next the sun has a beautiful bright red cheek, ripens July 5, a month earlier than Bartlett. On account of its beauty and excellent market quali-

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ties, this variety has always been the most profitable pear sent to the Louisville market.

Other practical essays were read—one on "Raspberries," by Isaac Fawcett, Edwardsville, Ind.; "Strawberries—Varieties and Culture," by the Secretary, J. Decker, Fern Creek, Ky.; "Roses," by W. F. Hibbard, of Louisville; "The Best and Most Popular Bedding Plants adapted to the latitude of Louisville," by Charles Neuner, of Louisville. All of these papers and others elicited interesting and profitable discussion among the members.

The attendance at the different sessions of the annual meeting was not as large as is usual at similar meetings of our Society, and the display of horticultural products was no larger than we usually see, and I do not think the specimens of fruit were finer than are sometimes shown at our meetings.

Your unworthy delegate was elected an honorary member of the Society, and was treated with great kindness and hospitality during the continuance of the convention. Respectfully submitted,

E. Y. TEAS.

On motion, the Society adjourned to meet in the court room at 9 A. M. to-morrow.

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THIRD DAY.

MORNING SESSION.

Promptly, at 9 A. M., President Johnson called to order, and introduced Dr. Furnas, who made his

REPORT OF ILLINOIS HORTICULTURAL SOCIETY.

To the President and Members of the Indiana Horticultural Society:

GENTLEMEN AND LADIES:—Warsaw is on the Mississippi river, in Hancock county, and nearly opposite the line dividing Iowa and Missouri. It is the site of old Fort Edwards, where General Taylor was stationed in the Blackhawk war, some of the remains of which are yet to be seen. The situation is high and beautiful, and its fine soil impresses the visitor at once with its fitness for successful orcharding.

On the Toledo, Peoria and Warsaw railroad I made the acquaintance of other horticulturists on their pilgrimage to the same Mecca; and when we arrived at Warsaw we were received with kindest and most cordial greetings. Fruit growers have no secret signs, grips or passwords, and yet all on that train going to the Warsaw meeting were identified and more or less acquaintance formed before arriving at the station, though, perhaps, no two of that company had met before.

In visiting an Illinois meeting one may reasonably be excused for expecting a "feast of reason and flow of soul," but here, where three separate cities in as many States are all in sight at once and from the same place, all more or less interested in horticulture, we readily feel the triple influences which combine to furnish abundant material for an interesting meeting. This trinity is formed by Alexandria, in Missouri, Keokuk, Iowa, and Warsaw, in Illinois.

We found the meeting organized and hard at work on the knotty subject of how to get rid of the cabbage worm. The discussion ended much as it began, without eliciting any positive, practical, reliable remedy against the encroachments of this cabbage eater. Something, however, was learned in reference to the habits of this worm. It was taught by the State Entomologist, Professor Thomas, that the egg, worm and butterfly, in their three respective states, live a period of sixty to seventy days, and that it often multiplied to the fourth generation in one season.

The situation of the egg on the underside of the leaf presents a very serious difficulty in the application of any destructive agent, either dusted on in the form of fine powder or sprinkled in solution, and if a remedy was applied so as to reach them of sufficient acridity to destroy the worms, it would

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also endanger the plant and thus do infinitely more harm than good, and poisons, of course, would be inadmissable. Finally, the effectual remedy against the *Pieris rapae* now known seems to be catching and *killing them.*

The curculio received his annual anathema in silence. D. B. Wier, of Lacon, declared their only defense against its attacks on the cherry laid in early varieties. For success in plum culture, eternal vigilance in the jarring process or thick-skinned varieties with acrid juices while immature are the principal means of defense.

One gentleman stated that the immunity from the attacks of the plum gouger and curculio, exhibited by the Wild Goose, Miner and the Weaver plums, was not so much in the toughness of the skin as in the acrid or some other quality in the juice of the plum, which had the effect to annul, flood or destroy the fresh deposited egg of these insects. In proof of this theory he cited numerous instances in which he had observed the crescent abrasion of the surface of these plums, but upon the most careful search could find neither ova or larva, where in a corresponding number of gouges upon the thin-skinned varieties the egg or larva was generally found.

When the subject of the Snyder Blackberry was under discussion, secretary Galusha asked if the position that E. C. Hathaway, of Ottawa, had previously assumed had been found true during the past year; that is, that habitual shortening tended toward the deterioration of the plant, and ultimately to its worthlessness and final rejection. The answer was not definite, but many members suspected that tendency under the shortening system with all varieties of blackberries. Wier said he had a blackberry patch that had been standing thirteen years and that the last crop was as good as any, and this under the "let alone treatment."

President Earl's address was a literary and practical production of the highest rank. One feature urged in it was specialties. He did not favor a mixed horticulture, urging that there was quite enough in the department of small fruits without engaging in other branches of fruit growing for the most active and strongest intellect. Wide as we may differ from this teaching, in a pecuniary point of view, we will perhaps be willing to admit that perfection should be our aim, and that this is most to be met with where a special effort at completeness in the strictest sense of the term is used in cultivation.

The president closed his remarks with a strong appeal to the people of Illinois to engage more extensively in forestry, which resulted in the society taking up the subject in session, in which much interest was manifested.

Singular, indeed, but true; those assigned for papers on forestry and ornamental tree planting, made no report. These gentlemen were Robert Douglass, Hon. J. W. Fell and Dr. Warder, all of whose presence, as well as their productions and council were seriously missed in the meeting.

The strawberry business in Southern Illinois is much more extensive than most of us are aware of. Notwithstanding their principal market is Chicago, Parker Earl shipped from Cobden, in southern Illinois, through Chicago to Buffalo, New York, in refrigerator cars, the fruit in quart boxes, in sixteen and thirty-two quart crates, none of which are returned. Some

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faint conception of the box and crate business may be arrived at when we are told that last year $16,000,000 worth of strawberries was handled in Chicago during the strawberry season.

While the soil of Southern Illinois stands without a successful rival in the world for the production of strawberries, it would seem also that it has more insect enemies than anywhere else. As in other pursuits, so in this; some men make money while others fail. Some make large profits, others lose money. The competition is so strong, and the expense of production and reaching market so great, that it often turns out that the returns show a meager profit, and sometimes a positive loss.

Most strawberry growers change their varieties so often that it is hard, telling what is the leading or preferable kind. Many adhere to the old Wilson, a few to Boyden's 30; some praise Crescent, others condemn it because it needs fertilization. Monarch ripens one side at a time, and hence will not do for the fastidious. Great American fails too frequently, etc. I was able, however, to learn that most members spoke well of Charles Downing. Downer is reliable. Cumberland Triumph had many admirers. Some spoke of the fine success of Colonel Cheney. Kentucky had friends, so had Captain Jack; and so had each one his particular favorite, from all of which we may learn to take hold of new varieties cautiously and retain those that succeed best on our own grounds. In reference to the cultivation of strawberries one (to me) new idea was suggested. Many, if not most, of these strawberry growers mow their grounds as close as they can immediately after gathering the fruit. A Mr. H. K. Vickroy, of Normal, was in the habit of treating his grounds thus. On a certain occasion, after the mowing, his grounds caught fire and burned all over. To his surprise the crop seemed all the better for this fiery ordeal, and now he has adopted the plan of burning over his grounds every year.

The Turner raspberry is still a favorite among many of the Illinois fruit growers. It evidently does succeed there better than with us. Among Black-caps the Mammoth Cluster still holds its honored position. Gregg, though new, is rapidly advancing in popularity.

A paper on orchard culture was read by Hon. J. W. Robison, of Tremont. The paper was eminently practical, but the particular thought, to which I wish to call attention was the recommendation of "girdling" trees for the purpose of inducing fruitfulness. He says he has practiced it with decided benefit to the crop, and no apparent injury to the tree.

The show of apples was very fine, quite extensive, of good quality and high colored. Most of the varieties were such as you are familiar with; of these I need not speak. A seedling by the name of *Siloam*, grown by E. C. Hathaway, of Ottawa, is attracting considerable attention. It is claimed that it will rival Ben. Davis in productiveness, and is of much better quality. I became sufficiently interested in this apple to inquire after the trees, and was told that it was being propagated rapidly, but that it was not in the market yet, and could not now be obtained at any price. For a description I refer you to the specimen which I brought with me and is on the table

A plum called the Shaker was spoken of very highly. It is stated that a year-old plant bore sixty plums.

The Wilkinson Winter pear was on exhibition. It is claimed that it has

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never blighted in forty years, and that the mother tree bore 120 bushels of pears in the last six years. It is a long keeper, not in eating yet, but when ripe it is claimed that it is a good pear. I also present specimens of it herewith which will render a description unnecessary.

The Weaver plum was spoken of as one of the tough-skinned, curculio-proof plums that promises to be an acquisition to our list of that fruit. It is a freestone.

Illinois Beauty is an apple of fine appearance which I also place on the table. It is over-ripe, but of good quality.

Huddleston's Favorite strawberry was spoken of as promising well, though but little disseminated. It will be remembered that this is an Indiana berry, and of course we are glad to hear of its success.

The Longfellow strawberry was announced as having come to stay.

Kentucky was recommended for sandy ground.

I am glad to notice the importance attached to the persimmon by placing it on exhibition. Though not a new fruit, it is slowly gaining a more deserved reputation. We had visions of persimmon pudding and good cheer at first sight of them.

The Lady Washington grape received a handsome notice from Secretary Galusha, which tells much in its favor.

The Prentiss was there to speak for itself. This is a satisfactory way of advertising a new fruit, and one that no honest competitor is afraid of. We have waited long and impatiently for a white grape that would be a "noun," instead of something that existed only in the imagination. We hope it will prove a valuable acquisition.

A citizen of Warsaw exhibited the Ives by the drawer-full, and said he had no more trouble in keeping it than he had in saving the Janet apple. The only care he had given them was to pack them in drawers in an open shed.

Thus I have noticed varieties of fruit in a disconnected way in the order in which I find them in my notes. Doubtless many other matters might be mentioned of general interest which I did not include in my jottings. Secretary Galusha has a wonderful faculty of getting reports and essays which go to make up the annual reports of the Society, all of which are of deepest interest, coming as they do from practical fruit growers, and, as a whole, is a faithful reflex of the status of fruit growing in Illinois.

The State Entomologist, Professor Thomas, was in attendance, and gave a lecture on the relation of crops to drouths and rain falls, illustrated by charts of his own drawing, and also showing that the heat and drouth of two consecutive years have much to do with the multiplication of the chinch bug. The professor is a plain, practical teacher, as well as interesting.

The following is the name and address of the officers of the Illinois State Horticultural Society for the ensuing year:

President—C. N. Dennis, of Hambleton.
Vice President—H. K. Vickroy, of Normal.
Secretary—O. B. Galusha, of Morris.
Treasurer—S. G. Minkler, of Minonk.

Their next annual meeting will be held in Chicago.

Very respectfully submitted.

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Dr. R. S. Mitchell then presented a report on

ENTOMOLOGY.

IS IT NECESSARY TO KNOW OUR INSECT ENEMIES FROM OUR INSECT FRIENDS?

From some cause the subject of entomology is now gaining favor with the people in many parts of this State, as well as in many other States, and a desire to know more about entomology, or our insect families, is acknowledged by all who are paying any attention to instructions on this interesting and useful subject. It is also well known that our injurious insects are rapidly on the increase, and we often hear the earnest inquiry, what will we do to protect our crops from destruction?

That it is necessary to know our friends and our enemies in the insect world, many examples might be brought forward to prove that it is to our advantage to know them, and to know them well. And, first, we will bring before your minds some of the timber boring beetles, a class of insects that belong to the order coleoptera, and, with few exceptions, the timber-boring beetles belong to this order. A family of coleopterous insects, known as the long-horned or capricorn beetles, the larvæ of which are wood-borers and were originally only found in our forests; but the forests are destroyed and they have been forced to come to cultivated timber to sustain life and for the propagation of their species. With a number of these many of us have become acquainted from their peculiarly mischievous habits, and among them we find the apple and pear tree borers, the peach and locust tree borers. The apple tree borers, (saperda bivitata) and locust tree borers, (Clytus flexuosous) of the old authors, are at their work very soon after the trees are constitutionally damaged by heat, or cold, or any other cause; and, as they work under cover they are seldom disturbed by changes in the season, or by our birds until their work is done.

Twenty years ago over three hundred species of the wood-boring beetles were known in the United States, all of which pass their larvæ state in decaying trees or wood. There are other families of this order that are timber-boring in their habits. Many individuals of the (Lamellicornia) family, and the almost entire families of (Buprestidæ and Elateridæ) which are found in the (Serricornæ) group, are wood-boring in their habits and destructive in their tendencies. Some of these are leaving their homes in the forest wilds assisting the Saperdæ in their work on the apple trees. Their habits are to bore higher up the trunk than the Saperdæ.

When we have good authority for saying that but a few years ago we had over three hundred species of these families described and known, at this date the number of our insect enemies becomes alarming indeed.

The family of curculinidæ, or snout beetles, are all borers in their habits, and are, perhaps, more destructive to the fruit products of the soil than any others. Over four hundred species of these curculios are known to entomologists. These insects do not confine their operations to any one particular substance; some bore into wood, fruit and nuts, some into different kinds of grain, and others into leaves and stocks or stems of various kinds of

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plants. We have many other coleopterous insects more or less destructive to vegetation in their habits.

But I wish to speak of other injurious insects that will come under the order Lepidoptera. This order embraces butterflies and moths, and in this order we find the much dreaded peach-tree borer (Ægeria). A large number of these in the larvæ state defoliate our fruit trees, and if permitted to continue they destroy the quality of our fruit by depriving it of that element which only the leaves can furnish. This class of insects are easily detected, and may be easily arrested if taken in time.

Under the order Hemiptera we have any number of insects injurious to vegetation, and ought to be known by all vegetable and fruit growers Among them we have the squash bug (coreus tristis) and various kinds of plant lice (aphis), the bark lice (coccus), and too many others to bring before you at this time.

How few of us have for one minute given a thought on the subject of the vast, silent, and unseen armies of insects, and the enormous power they wield. How many of these insects that make up these armies do you suppose are ever seen by the careless observer? How many do you suppose, to the thousands, are ever seen by the practical entomologist? The observing naturalist could only conjecture in his estimate of the armies of grubs and caterpillars that during one summer season are hidden in the foliage, buried in the ground, submerged under the water, boring under the bark or in the solid wood of trees, or living in the bodies of animals.

Insects now have a share in almost every department of nature, and in many of these departments the work they perform is so important that they deserve from man more attention than he is willing to give.

Insects to the eyes of many persons are small, feeble and contemptible things, but insects in families and tribes are mighty hosts, and work with an influence that excites equal wonder, surprise and admiration in all minds who can appreciate them and their universal work.

Entomology is seldom the gainer from our traveling part of community so few of them ever think of observing an insect unless it bites him; such an idea never enters his mind to look after them and see the work they have to do to keep the world's machinery in running order, but he seems to look upon them as if they were made to be avoided or destroyed.

We have many things that work against the prosperity of the planter, and one of these is to have his trees and canes destroyed by these beetles.

When the timber in the forest dies, these beetles are very soon at work to reduce it to a condition for food for other trees.

Apart from a direct benefit or injury to man these insects are working to one universal purpose, to gradually improve the earth and its resources; we have a large number of this class of insects that are gradually destroying the useless matter for something better.

We have other insects that are employed in killing and eating their fellow-insects. This act holds in check their increase, and guards against their going beyond certain bounds very far or very long at one time.

The cause of the rapid decay of our forests in many sections of Indiana, and the increase of the timber-boring beetles, and the remedies, would be

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out of place here, but will be the work of the State Entomologist, when the great State of Indiana has succeeded in having one appointed.

It has often been a thought of surprise to me that the people of this great State will suffer a loss of from one-fourth to one-half, and even more than that, of some favorite crop by insect depredations without trying to know what hurt them, and care so little about trying to prevent a like disaster the next year, but rather make arrangements to raise enough for home use and an increased supply of insects.

"Prevention is better than cure" is an old saying, and applies with as great force in our management of injurious insects as anything else. We are all interested in this movement; we must remember that by instructing our neighbors we are helping ourselves, and as horticulturists we should not abridge our efforts, but see that more attention is paid to this subject in our schools and colleges.

I shall not hesitate to do my part to bring about this day as early as possible. If I had the means my inclination would be to visit every county, and if possible, every school in the State, and talk this matter up in the minds of all in such a manner that I would try to impart sufficient knowledge on this subject in this State to enable the government to guard against injurious insects of other States, and to enable individuals to guard against the bad bugs of their neighbors. Have I answered the question, that to protect our crops it is necessary to know our insect enemies?

J. W. Furnas The time is very near when I must leave, and yet we have done nothing with our star list of fruits. This important business must not be passed over without attention. The planters of trees expect this Society to give them information in regard to what they shall plant. As it is now evident that the Society can not revise the list, I move that it be referred to a committee of twenty-four members, to be selected from different portions of the State, to meet in Indianapolis the Tuesday after the meeting of the Board of Agriculture, to revise the list. After some discussion the motion was amended to include only the officers of the Society, and adopted.

The Committee on Finance and Accounts then reported.

Your Committee on Finance and Accounts have examined the reports of the Secretary and Treasurer, and find them in all particulars correct. After fully considering the suggestions of the Secretary, in regard to an increase of his salary, we would respectfully refer the matter back to the Society without recommendations.

D. E. Hoffman,
J. C. Maxwell,
R. T. Brown,
Committee.

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On motion of Prof. Ingersoll, the salary of the Secretary was increased to $250.

W. A. Ragan, Chairman of the Committee on Officers' Reports, asked leave to present the following:

We find the following recommendations which we would respectfully submit for your consideration, and would urge you to take such action upon them as may be best for the interests and well being of this Society.

1. That the time of holding our annual meetings be changed to the third Tuesday in November.

2. That a resolution be passed by this meeting, asking our Legislature to increase our appropriation two hundred dollars, and that a committee be appointed to lay the matter before both houses of the same, and urge the importance of such increase.

3. That our President and Secretary be instructed to urge upon the State Printing Committee the importance of having a larger edition of our proceedings published, and if this can not be attained, to have an edition printed in cheaper pamphlet form for distribution among our horticulturists and fruit growers. All of which is respectfully submitted.

W. A. RAGAN, *Chairman.*

After some discussion, participated in by a number of members, a motion to adopt the first recommendation of the committee was lost.

The second and third recommendations were adopted.

Mrs. Julia B. Hosford, of Terre Haute, being present, read the following original poem, dedicated to the invited guests who have entertained us with such excellent papers.

COME, JOIN OUR BAND.

Come, join our horticultural band—
Make it a power in the land,
Which for ages shall be felt
Like a mystic zone, a magic belt.

We have listened to these white-haired sages,
Filled with the lore of ancient ages;
Dame Nature's pages were also read
To us by sages with younger heads.

We see the power which learning brings
To teach us the beauty and use of things:
How Nature adjusts without a flaw
The tiniest plant to forms of law.

These learned students of Nature's book
Have told us how and where to look
To find the source of hidden springs
Which to us marvelous beauty brings.

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For knowledge and the subtle power
Of utilizing each plant and flower;
Thus mysteries of the darkened night
Are quite dispelled by morning's light.

Then let us combine what here we find,
The vigor of youth with older mind;
And we think it a fitting place
That ladies' presence well might grace.

God made the mother's heart to swell
With fears and joys she dare not tell,
While each onward step of her boy
Is watched and hailed with heartfelt joy.

Then let us have within this land
A horticultural family band,
Where wise old age and tender youth
Shall meet to learn the ways of truth.

QUERY BOX.

Query No. 4. I want to ask the Society, if there has been a use discovered for which it can recommend the plant known as *nicotianum*, commonly called tobacco?

I. N. Barker It has, indeed, a great value in connection with the poultry yard. Without it, poultry breeders would be seriously perplexed with vermin.

Dr. Furnas. It is also useful in green houses as an insect destroyer.

Fielding Beeler. And also in the sheepfold for the same purposes.

No. 5. Has the Cutberth raspberry been fruited by any member of this Society, and with what results? No answer.

No. 6. Has any efficient remedy been found for the rust on the blackberry?

W. H. Ragan. Having given up in despair, I resorted to the use of the mattock. This was, of course, effectual.

No. 7. Should mature orchards be cultivated with the plow?

Dr. Warder. This depends very much upon the character of the soil. Orchards are planted for fruit. Checking the growth induces fruitfulness. Some varieties incline to make too much growth, others are fruitful to a fault. Avoid deep cultivation. A better plan is to keep up regular culture from the start. Then the roots are formed below the plow, and are not interrupted.

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No. 8. Having once known a valuable apple in Missouri called the Holt, I desire to know if any person present, can give information as to where I can get it?—*W. A. Workman.*

Z. S. Ragan. There is an apple cultivated in Holt county, Missouri, which is, probably, a synonym of Western Beauty.

No. 9. Which the best mode of field culture of the raspberry, width of rows and distance of plants?

C. M. Hobbs. The rows should be eight feet wide, and the plants three feet apart. Cultivate with horse and plow, taking care not to run too deep. Do not cultivate after fruit begins to ripen. Pinch back the young shoots to twenty inches.

J. H. Priest. The rows should not be closer than seven feet.

No. 10. Is strawberry rust caused by late spring frosts? Is there an efficient remedy for it known?

J. W. Ragan. I have but little acquaintance with this trouble, and know even less about a remedy.

No. 11. What is the best way of gathering and keeping winter apples?

W. A. Ragan. Careful hand picking, and keep above ground as long as there is not danger of freezing, then put in a cool cellar.

President Johnson. I had some apples frozen this fall before taking into the cellar. They are now keeping nicely.

No. 12. Is a tree budded above the ground more hardy than a root graft?

Dr. Furnas. As a general thing not. If it is a tender variety, budding up may be an advantage.

C. M. Hobbs. This idea is being presented by eastern tree agents. They are no better.

On motion of Dr. Furnas, Prof. Burrill, of Illinois, and Mr. Kingsbury, of the Indiana Farmer, were made honorary members.

DELEGATES TO OTHER SOCIETIES.

The President appointed—

Hon. Joseph Gilbert delegate to the Kentucky Society.
Prof. C. L. Ingersoll delegate to the Ohio Society.
Granville Cowing delegate to the Michigan Society.
Dr. A. W. Brayton delegate to the Illinois Society.
Hon. P. S. Kennedy delegate to the American Pomological Society.

Secretary Ragan then made a report of

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THE MISSISSIPPI VALLEY HORTICULTURAL SOCIETY.

During the last annual meeting of the Missouri State Horticultural Society, held in the city of St. Louis, in January, 1880, at which delegates were present from several western States, it was resolved to organize a Mississippi Valley Horticultural Society. A committee, of which Parker Earle, of Illinois, was made chairman, and Prof. S. M. Tracy, of Missouri, Secretary, was organized. Correspondence was at once open up with the various State Societies in the Mississippi valley, most, if not all of which, heartily seconded the proposition to organize. A few of the arguments in favor of such a movement may be briefly stated. *The American Pomological Society*, as its title implies, only covers one branch of the horticultural field; its meetings are biennial only, not of sufficient frequency to subserve the best interests of the cause; these meetings were almost invariably held east of the Allegheny Mountains, and hence, did not form a nucleus around which the local societies of the Mississippi valley could concentrate. *The horticultural interests of the west* should have a head. An organization embracing the States of the Mississippi valley, and holding annual sessions, while it would still be subordinate to the American Pomological Society, would serve as a center around which the State societies should work harmoniously, and in unison with each other.

Encouraged by the favorable response from local societies, as well as from private sources, the committee decided to hold the first meeting for the purpose of effecting a permanent organization, together with an exhibition of horticultural products, in the city of St. Louis, September 7, 8 and 9 last. The merchants and business men of the city, in addition to donating the use of the Merchants' Exchange, said to be the finest hall in America, guaranteed the sum of $3,000 for the purpose of paying premiums. With this liberal endowment the Society was enabled to offer premiums that brought together the grandest exhibition of horticultural products ever witnessed in the West, if, indeed, on the continent. The grand hall, three hundred and twenty feet in length, eighty feet in width and seventy-five feet to the beautifully frescoed ceilings, contained over one thousand specimens of rare plants from the greenhouses and conservatories of the city, with cut flowers and floral ornaments in profusion, while the fruit tables literally groaned under the vast pomological display.

There were semi-tropical fruits from the Sunny South; rich, rare and curious specimens from the Pacific Coast; hardy iron-clads from the North; luscious grapes and pears from off the Hudson and the Genesee, while the highly favored lake-shores, the Egyptian hills, the American Desert and the valleys and hills bordering on the Father of Waters, each and all contributed bountifully to the display. *Twelve thousand plates* of fruit, none but the very choicest specimens, were estimated as the contents of the grand hall. It would weary you were I to attempt to particularize, besides it would be simple injustice for me to draw comparisons by mentioning as most deserving any particular exhibition. The crabs and hardy Russian and native varieties from the extreme north fairly illustrated the possible resources of that re-

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gion only so recently thought to be beyond the limits of tree-fruit culture, while the authors of our school-day geographies would have been astounded at the displays from the *late* "*American Desert*." In every particular, except in point of attendance and financially, the exhibition was the consummation of all that could have been desired. It was a complete exposition of the horticultural possibilities of the country.

But grand, beautiful and instructive as the exhibition was, it would not *draw*. The hundreds of thousands of citizens of St. Louis who patronize and sustain a number of theaters and other places of amusement and resort—some instructive and moralizing, but largely the reverse—were not in attendance. A horticultural exhibition is too tame a show. A trapeze performance, with a hazardous display of muscular power (the more hazardous the better the draw), would have drawn much more largely on their patronage and support.

THE ORGANIZATION.

But as the exhibition, grand as it was, and so full of practical lessons of value, is of secondary importance, I shall now devote myself more fully to a report of the business features of the meeting and to the permanent organization of the Society. As intimated above, the call for this meeting emanated from a committee appointed at the last annual meeting of the Missouri Horticultural Society, and was cordially responded to by the leading horticulturists of the West.

There were in attendance: Warder, Campbell and Trowbridge, of Ohio; Ricketts and Hubbard, of New York; Rowe and others, of Michigan; Galusha, Earle, McPike, Burrill, Hollister, Hammond, Johnson, Beckwith, and various others, of Illinois; Furnas, of Nebraska; Decker and Samuels, of Kentucky; Colemant, of Mississippi; Johnson and others, of Kansas; while Texas, Louisiana, Arkansas and other Southern States were well represented. Missouri horticulturists were out in force, and Indiana had at least two representatives present.

The Constitution adopted declares the title and objects of the society; that any person interested in horticulture may become a member by the payment of an annual fee of two dollars. In addition to the usual executive officers, there shall be one Vice President from each State, to be elected by the State Society he is to represent. In case any State Society should fail to elect a Vice President, then the vacancy will be filled by the Executive Committee. The term of office of the President, Secretary and Treasurer shall begin on the 1st day of January following their election. Annual meetings will be held, unless otherwise ordered by the Executive Committee, on the first Tuesday in September. The officers of the Society shall constitute an Executive Committee.

Parker Earle, of Illinois, was elected President; Ex-Governor Furnas, of Nebraska, First Vice President; Prof. S. M. Tracy, of Missouri, Secretary; and H. G. McPike, of Illinois, Treasurer.

The Executive Committee was directed to arrange for the next annual meeting, to be held in the city offering the greatest inducements.

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(Your delegate ventured to suggest Indianapolis. It is possible that, through the coöperation of the State Board of Agriculture, the citizens of Indianapolis and this Society, such a desirable result may be accomplised.)

A lengthy discussion, indulged in by members from almost every State represented, was had relating to the best methods of keeping up an interest in such meetings. It was unanimously agreed that liberal premiums on fruits and horticultural products would call together a larger representation from a wider range of territory, but it involved an interminable obstacle in the question of finance. This exhibition had fallen far short of success in this particular. In concluding this branch of the discussion the Society adopted the following resolution, offered by Dr. J. A. Warder:

Resolved, That the promotion of horticulture by the action of this Society may be best advanced by meetings for discussion of papers and propositions connected with horticulture, both scientific and practical, and that exhibitions of the various productions should be rather incidental and illustrative than the chief object.

Prof. T. J. Burrill, of the Illinois Industrial University, presented a very able paper in relation to recent microscopic discoveries and investigations, as connected with the blight in the pear and apple. His remarks were illustrated by numerous diagrams and specimens.

Your delegate would *commend much* and criticize but little. He also indulges the hope that much good may result from the new organization. One point worthy of *criticism* is the almost entire absence of information given by the various awarding committees. There should have been some valuable lessons promulgated from such an exhibition, as the one held in connection with this meeting. The simple fact that Mr. A or Mr. B receives premiums on articles shown is of little value, save, perhaps, in a financial sense to himself, while a report embracing reasons actuating the committee might be of incalculable benefit to others.

Dr. Furnas. Parker Earle told me the Society would come to Indianapolis for four thousand dollars.

W. H. Ragan. If it is possible to get the meeting at Indianapolis, it will be through the State Board of Agriculture, and to be held in connection with the State Fair.

The Secretary reported several papers, which were referred for publication without reading.

REPORT OF L. B. CUSTER, FIFTH VICE PRESIDENT.

To the President and Members of the Indiana Horticultural Society:

In accordance with the duties incumbent on me as one of your Vice Presidents I herewith submit my report:

In order to obtain the necessary facts for making a report I addressed letters to some one in nearly every county in this district asking for information in regard to the fruit crops and the general progress of horticulture.

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The result of this correspondence was the production of six reports from as many counties.

The apple crop in Cass county this season was very abundant, and apples and cider went begging. Apples are keeping very well, and at this time December 17, there is more demand for them and fair prices are paid.

The codling moth got in its work, as usual.

The twig blight made its appearance this season in both orchard and nursery, but not to an alarming extent.

Peaches were very plentiful where there were trees.

Early Richmond cherries bore full, and of extra quality; other varieties were a failure, as usual.

Grapes of all kinds rotted badly and ripened very unevenly, especially where they were neglected. My Concords did well, but the Hortfords rotted and fell off. They have proved worthless with me.

Of blackberries there was an enormous crop, both of cultivated and wild varieties. The Snyder has done well with me.

Raspberries did moderately well. Mammoth Cluster is mostly grown. The Gregg does well, and will probably supersede all other varieties.

Strawberries suffered severely from late spring frosts. A number of varieties are cultivated, but the berry has not appeared that can take the place of the Wilson.

I herewith submit the reports received by me.

T. A. Peffer, of St. Joseph county, reports as follows:

"In complying with your request, I send you the following:

"Apples were a good crop. Many of the winter varieties were blown down by a violent storm just before picking time, and farmers, not wishing to lose them, rushed them into market, causing quite a glut. The consequence is, that first class apples, at the present time, are scarce. Leading varieties are Jonathan, Wagner, Peck's Pleasant, Northern Spy, Baldwin, Hubbardson's Nonsuch, Maiden's Blush, Rambo and Early Harvest.

"Pears were as plentiful this year as I ever saw them. The trees are not blighting as much as usual. In order to have first class pears, the trees should be mulched with coarse manure every spring. Leading varieties are Bartlett, Flemish Beauty, Seckel, Clapp's Favorite, Howell and Onondaga.

"Grapes were quite abundant, but did not ripen as well as usual. Leading varieties are Concord, Ives, Hartford and Diana. The Hartford is hardly worth cultivating, as it rots badly and drops from the stem. I will have bearing next year, Moore's Early, Lady and Brighton. I am very much pleased with Moore's Early, it will undoubtedly take the place of the Hartford.

"Strawberries were a large crop. The leading varieties of my neighbors are Wilson, Green Prolific, French, Jucunda and Kentucky. Leading on my place are Crescent, Sharpless, Miners' Prolific and Glendale. I have discarded Wilson, Green Prolific, French, Jucunda, Col. Cheney, Monarch, Great American, Nicanor and Kentucky. I am testing Crystal City, Windsor Chief, Cumberland Triumph, Champion and Lengfellow. My Crescents yielded double the amount of the Wilson, with same care, and were much finer berries in appearance.

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"Raspberries a fair crop. Leading varieties of my neighbors are Davidson's Thornless, Mammoth Cluster and Philadelphia; on my place Gregg and Turner. The Gregg is superior to the Mammoth Cluster in every respect.

"Blackberries were a good crop. Leading varieties are Taylor's Prolific, Snyder and Lawton."

L. W. Shelton, of Rochester, Fulton county, furnishes the following:

"The apple crop of Fulton county for 1880 was very large and of fine quality.

"In my neighborhood the Yellow Bellflower, R. I. Greening, Rambo, King, Ben Davis and English Russet are among the leading varieties of apples.

"I think the Rambo and Bellflower the most profitable, for the reason that they bring the most money in the market.

"Apple orchards are in good condition, the trees generally healthy and thrifty.

"The peach crop was fine where there was trees large enough to bear. The culture of the peach is very much neglected by most of the farmers. As for myself I make a practice of setting out a few trees every spring, and I now have ninety-five thrifty trees that were full of the luscious fruit the past season.

"The cherry crop was not very good except the Early May, they were full of very fine fruit, selling at six cents per quart.

"The grape crop was very large and fine, no blight or mold.

"The gooseberries and currants were destroyed by the worms."

Wm. Holland, of Plymouth, Marshall county, sends me:

"I can not give you much of a fruit report from this county, as it is not much of a fruit growing county.

"The apple crop was very scarce this season; the apple trees are blighting badly here; that is, large trees in orchards; trees in the nursery are doing well. Farmers do not care for their orchards as they should. It seems that they have been trying to see who could have the most varieties of apples, consequently there are but few orchards worth much in this county. There are no large commercial orchards here.

"The peach crop was fair, although there are but few peach trees here.

"Grapes did not do well; rotted badly on account of wet season. Generally they do well.

"Not many strawberries grown here. I have grown a lot myself, but find a poor market for them, and am plowing up the most of my strawberry beds.

"As to blackberries, the Snyder is the best with us; perfectly hardy.

"As for raspberries, Mammoth Cluster (black) and Turner (red) do best with us, also Doolittle. I have grown the Thwack and Brandywine successfully; they are hardy, red berries. I have some of the Gregg raspberries that will bear next year."

H. P. Hanford, of Bristol, Elkhart county, writes me:

"The crop of apples was large in this section, but was badly damaged by the codling moth. Those now on hand are keeping poorly, owing to the hot, dry autumn.

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"The cherry, plum and peach crop was good, where proper precaution was taken to protect them from the ravages of the curculio.

"Grape crop large, and of fine quality.

"I should be very glad to meet with you, but my health will not permit. Inclosed find one dollar for my membership fee."

A. D. Perry, of Winamac, Pulaski county, sends the following:

"Apple crop only medium, say an average with us. Varieties mostly grown are Maiden's Blush, Red Astrachan, Early Harvest, Hightop, Rambo, Alexander, Yellow Bellflower, Rawl's Janet, Winesap, English Russett, Gilpin, Roman Stem, Baldwin, Spitzenburg and Tulpehocking; most profitable, English Russett, Rawl's Janet, Maiden's Blush, Rambo, Early Harvest, Yellow Bellflower and Winesap. Apples are inclined to rot early. Orchards in a fair condition.

"Did not have but few peaches; mostly seedlings.

"Cherries, but few; none do well here except Early Richmond; they are full every year.

"The grape crop was good. Concord, all that is profitable, did not rot. But few other varieties grown.

"Blackberries were a failure.

"Raspberries good. Doolittle and Mammoth Cluster mostly grown.

"Strawberries.—Wilson, Russell and Monarch of the West are grown. Wilson most profitable.

"Fruit of all kinds badly neglected."

Thomas Hughes, of Hebron, Lake county, informs me that they had hardly an average crop of apples. He names forty-seven varieties of apples that are grown in Lake county; "the most of them do tolerably well." He says: "We have not got a fruit country here, as in many other parts of the State. Our county is mostly new in fruit-growing; a large portion of it has been lately settled, and the county is mostly prairie. The orchards are not in good condition; they are too much exposed to the bleak winds; the trees are generally diseased on the southwest side. Rabbits injure the trees very much.

"Apples ripened early, and are not keeping as well as usual.

"The cherry does well here; the Old Morello bears well, also the Early Richmond.

"Pears and peaches are a failure generally; this year they bore well where there were any trees.

"Raspberries and strawberries do well."

S. T. Sterling, of Camden, Carroll county, writes as follows:

"The people of this vicinity do not take much interest in horticulture—just enough to plant orchards of some of the more hardy kinds of fruit. Of apples, may be named the Bellflower, Winesap, Vandever, Pippin and some earlier varieties. The May and Ox-heart are the cherries. The Bartlett pear is the only variety that I can name. Of small fruits natives are used mostly.

"The fruit crop of last year was heavier and of better quality than of one or two years previous. The cultivation of the plum has almost entirely ceased, on account of the curculio.

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"Too many of the people allow traveling fruit dealers to furnish them with trees. They have a book, with fine cuts of fruit with French names, and thereby make sales. The fruit often turns out to be either a seedling or some hard, leathery or insipid sort.

"I will use my best endeavors to do a good work for you and your Society."

On motion of D. E. Hoffman, the usual appropriation was made for the payment of premiums at the next annual meeting.

President Johnson appointed W. H. Ragan, Dr. Furnas and Fielding Beeler, a committee to look after the matter of legislative aid.

The Secretary called attention to specimens of the Mann apple from the orchards of E. Moody & Sons, Lockport, New York, which is described as follows by Downing:

MANN.

A chance seedling in the orchard of Judge Mooney, of Granby, New York. Tree hardy; an upright grower, with rather slender branches, forming a round head; an early and annual bearer; a late keeper. Valuable for market and cooking, and a fair table fruit. Fruit medium to large, roundish oblate, nearly regular; skin deep yellow when fully ripe, often with a shade of brownish red where exposed, and thickly sprinkled with light and gray dots, a few being areole; stalk short, rather small; cavity medium or quite large, sometimes slightly corrugated; flesh yellowish, half fine, half tender; juicy, mild, pleasant sub-acid. Good to very good.

The specimens presented had all the desirable characteristics of a long keeper and good market variety.

The Committee on Fruits on Exhibition reported the following awards:

Fifteen varieties of apples, Jacob Kennedy	1st premium,	$5 00
Ten varieties of apples, Joseph Gilbert	1st premium,	3 00
Five varieties of apples, Joseph Gilbert	1st premium,	2 00
One variety of apples, Joseph Gilbert	1st premium,	1 00
One variety of apples, L. B. Custer	2d premium,	50
Plate of Baldwins, J. N. Davidson	1st premium,	30
Plate of Bellflowers, E. A. Eichhoff	1st premium,	30
Plate of Bellflowers, Joseph Gilbert	2d premium,	20
Plate of Ben Davis, Z. S. Ragan	1st premium,	30
Plate of Ben Davis, Joseph Gilbert	2d premium,	20
Plate of Clayton, W. A. Ragan	1st premium,	30
Plate of Clayton, R. M. Ragan	2d premium,	20
Plate of Fallawater, R. M. Ragan	1st premium,	30

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Plate of Fallawater, Daniel Bulla	2d premium,	20
Plate of Fulton, E. A. Eickhoff	1st premium,	30
Plate of Indiana Favorites, S. Johnson	1st premium,	30
Plate of Indiana Favorites, Daniel Bulla	2d premium,	20
Plate of Jersey Black, E. A. Eickhoff	1st premium,	30
Plate of Jersey Black, S. Johnson	2d premium,	20
Plate of Jonathan, E. A. Eickhoff	1st premium,	30
Plate of Jonathan, Joseph Gilbert	2d premium,	20
Plate of McAfee, Z. S. Ragan	1st premium,	30
Plate of McAfee, Joseph Gilbert	2d premium,	20
Plate of Milam, J. N. Davidson	1st premium,	30
Plate of Milam, E. A. Eickhoff	2d premium,	20
Plate of Moore's Sweet, Daniel Bulla	1st premium,	30
Plate of Moore's Sweet, W. H. Ragan	2d premium,	20
Plate of Newtown Pippin, R. M. Ragan	1st premium,	30
Plate of Newtown Pippin, J. N. Davidson	2d premium,	20
Plate of Northern Spy, Daniel Bulla	1st premium,	30
Plate of Northern Spy, R. M. Ragan	2d premium,	20
Plate of Peck's Pleasant, Joseph Gilbert	1st premium,	30
Plate of Rambo, E. A. Eickhoff	1st premium,	30
Plate of Rambo, S. Johnson	2d premium,	20
Plate of Rawles Janet, R. M. Ragan	1st premium,	30
Plate of Rawles Janet, Jos. Gilbert	2d premium,	20
Plate of Rome Beauty, Z. S. Ragan	1st premium,	30
Plate of Rome Beauty, W. S. Irwin	2d premium,	20
Plate of Newtown Spitzenburg, R. M. Ragan	1st premium,	30
Plate of Smith's Cider, L. B. Custer	1st premium,	30
Plate of Smith's Cider, E. A. Eichhoff	2d premium,	20
Plate of Wagener, J. W. Ragan	1st premium,	30
Plate of Wagener, E. A. Eichhoff	2d premium,	20
Plate of White Pippin, Jos. Gilbert	1st premium,	30
Plate of White Pippin, Daniel Bulla	2d premium,	20
Plate of Winesap, Joseph Gilbert	1st premium,	30
Plate of Winesap, Z. S. Ragan	2d premium,	20
Half peck Sweet Potatoes, Miss L. J. Hiatt	1st premium,	50
Half peck Irish Potatoes, Miss L. J. Hiatt	1st premium,	50
Half peck Irish Potatoes, P. H. Burns	2d premium,	25
Red Onions, Daniel Bulla	1st premium,	50
White Onions, Daniel Bulla	1st premium,	50
Jellies and Canned Fruits, Mrs. J. C. Maxwell	1st premium,	2 00
Jellies and Canned Fruits, Miss L. J. Hiatt	2d premium,	1 00

FRUIT AT THE STATE HORTICULTURAL SOCIETY.

To the President and Members:

It was a matter of regret to all parties, as expressed by the Secretary, at the close of the recent meeting at Crawfordsville, that there should have been so little said respecting the fruit exhibited upon that occasion. No one

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could have regretted the omission more than the committeemen themselves, but it must be remembered that they were fully occupied in the discussions, that they had to go long distances to meals in the intermissions, and that at all times, when engaged at the tables, making awards, they were necessarily crowded and jostled by numbers of observers who were equally interested in the display.

By way of making some amend for our neglect of an important part of committee's function, the following notice is offered—being compiled from recollection and from very meager notes, this can not be taken as a full report of the exhibition:

The general display was good, and embraced quite a large assortment of apples and some delicious pears. The first impression produced upon one accustomed to our western fruits, was that these specimens had been produced in Central and Southern Indiana. This was caused, in part, by the peculiar local characters of the fruits themselves, not easy to define, and was also due to the prevalence of varieties, which are those established favorites of the orchards.

The Red Winter Sweet, more correctly the Moore's Sweet, the Vandervere Pippin, the White Pippin, White Winter Pearmain, and its confusing associate, the Michael Henry, the Winesap, the Smith's Cider, the Gilpin, the Newtown, Yellow Bellflower, Belmont, Rambo, and others of the old lists were on hand, as they have been at every exhibition since the organization of the society.

Among the Northern favorites few were presented, and those were not calculated to advance their reputation for excellent quality. The Baldwin, Northern Spy, Rhode Island Greening, Fameuse, Roxbury Russett, Talman's Sweet, Swaar, and others, were not up to their perfect characters as produced in higher latitudes. Some competing plates were ruled out as not in condition.

Of Southern varieties the Nickajack, long grown in the Ohio river counties as the Carolina Red Streak, still holds its own as a keeper. The Winesap, scarcely Southern, is a general favorite. The Rawle's Janet, the McAfee, the Shockley and others, were present, but not the Pryor's Red. The Milam, another Southern fruit, made its appearance here and was seen in the wagons on the streets of Crawfordsville.

Some of the newer kinds, both those originated in the neighboring counties and those which have been introduced were exhibited, notably, the Grimes Golden, beautiful specimens of which disappeared from the plates as they and the thoroughly ripened Jonathans always do when they are exposed to view. They are hard to keep until Christmas in this latitude.

The Indiana Favorite, which deserve to be better known all through Central Indiana, was exhibited from the original tree. The beautifully painted Lady Apple, of France, came as a special contribution from Decatur county, which now boasts a membership in this society.

New fruits were on the tables, as well as some not so new, but little known. Of the latter were some from the Ragan orchards, of old Putnam and Hendricks, particularly the Clayton, a promising market fruit. Of the former class, and so little known as to require especial notice, was the Jones apple,

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with a history as follows: From North Carolina, grown in a certain county, whose name is forgotten, for twenty years; a good bearer; a great favorite where known; has been kept by Mr. Lyons until April; Mr. Cavens, of Bloomfield, Ind., says he has known the apple for twenty years, and "likes the Jones better for all purposes than any apple he knows;" he recommends it for all purposes.

Description: The Jones is large, regular, globular-oblate; surface smooth, yellow, lightly covered with mixed light red and scattered brilliant carmine splashes; dots gray, yellow basis; basin rather wide, regular or folded; eye large, open; calyx segments short; cavity medium, regular, russet; stem medium, short; core medium, closed, regular, meeting or clasping the eye; seeds numerous, medium, plump; flesh yellow, tender, fine-grained, juicy; flavor mild, sub-acid; quality good; cooking, table and market; season, winter.

Unknown. Presented by Nathan Harvey, Bloomingdale, Parke county. A handsome, large apple, that seems to be a good keeper, and not in condition to show its best quatities.

Description: Large, globular, somewhat irregular. Basin rather folded but wide; eye small, closed; cavity medium, sometimes lipped, russet or green; stem medium. Surface nearly smooth, yellow, lightly covered with mixed red, and with indistinct stripes of bright red; dots numerous, small, grey, others very minute, dark, prominent rather than indented. Said to be a long keeper. Very promising.

The Mann apple, originally from Michigan, was also exhibited, having been sent on by our valued friend Mr. Moody, of Lockport, N. Y. This fine long keeper is large, oblate, regular, or nearly so; surface smooth, green, slightly bronzed becoming yellow; dots numerous, small, with gray vases. Basin medium, slightly folded; eye closed. Cavity medium, wavy, not deep; stem medium to short.

The quality when tasted last June, though not of very high flavor was good—having plenty of juice.

It will be valuable for shipping.

All which is submitted, W.

The following resolution, offered by Hon. Joseph Gilbert, was adopted:

Resolved, That, inasmuch as it is probable that with the near change in all other departments of the government, there will be a change in the management of the national department of agriculture, we earnestly request, first, that the new commissioner of agriculture, be chosen from the northwest. Second, that he be a practical business man, as well as one both scientifically and practically acquainted with agriculture and horticulture, and one in whom the Agricultural Societies and boards of our land may have full confidence.

Pending the passage of the resolution, several members spoke earnestly favoring its provisions.

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FORESTRY SPECIMENS.

A very interesting specimen of *Pinus Sylvestrus*, which had been girdled some eleven years ago by sap suckers denuding the wood for a space of several inches, and yet during all these years, the original top continued to push its buds, and to produce new leaves, which affected the continued deposits of woody fibre down to the point of injury—the crude sap having been able to ascend through the cells of the sap wood. A section of graft and stock, in the case of pear on the wild thorn, showing a fine growth of the former which had never possessed a perfect wood union of the two species—the connection appearing to be only that of the *cambium* and bark. These interesting specimens were exhibited by Jas. A. Little, of Cartersburg, Indiana.

Oak and ash leaves and fruit, herbarium specimens, were shown by Dr. Warder. Of oaks, fifty-nine forms were shown, of numerous species, all of great interest, and object lessons that might have proved of great value in the settling of many questions relating to the tendency to variation and the distinction of species of this important group of our forest trees. The ash specimens represent many species and varieties, but were peculiarly valuable as indicating plainly the difference between the noble white ash and the green ash, an inferior tree, that has unfortunately been confounded with its more valuable neighbor.

The Society then adjoined to meet at 1:30 P. M.

AFTERNOON SESSION,

On reconvening at 1:30 o'clock P. M., the Committee on Resolutions made report as follows, which was adopted:

Resolved, That we, the members of the Indiana Horticulture Society, now in session at Crawfordsville, Ind., in annual meeting, the 21st, 22d and 23d of December, together with our distinguished friends and visitors from abroad, would return our sincere thanks to the Montgomery County Horticultural Society and the citizens of Crawfordsville and vicinity, for the cordial welcome and hospitable entertainment they have extended to us. Also, to the county commissioners for the donation of the rooms in which our meetings have been held, and to the Faculty of Wabash College, and to the professors of our own State and to Prof. Burrill, of Illinois, and to Dr. John A. Warder, of

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Ohio, for their able and practical papers and lectures. Also, to the Indiana Farmer, Prairie Farmer, Farmer and Fruit Grower, and other papers that have generously advertised our meeting, and to the I., B. & W., Vandalia (Logansport division), L., N. & C., L., M. & B., and Pan Handle railroads, for their liberal reduction of fare to those attending our meeting.

Resolved, That this Society has heard with deep regret of the death of our late governor, James D. Williams, who has ever been a true and earnest friend of our Society, and we hereby extend our condolence to the surviving members of his family.

WHEREAS, The postage on all plants, seeds and cuttings, is double that charged on printed books; and whereas, this excess comes from the pockets of the buyer and not of the seller, because the seller makes the price cover this expense; and whereas, we believe that the dissemination of seeds, plants and cuttings are efficacious agents in the advancement of civilization and prosperity of the country, therefore,

Resolved, That we believe the rate of postage on seeds, plants and cuttings should be reduced to an equality with that of bound books, and that the Secretary of our Society be instructed to forward a copy of these resolutions to each Senator and member of Congress from this State, and that we earnestly urge them to use their influence to bring about this act of justice to agriculture, horticulture and floriculture.

Pending the adoption of the resolutions, Mr. A. J. Royalty said he did not think the citizens of Crawfordsville were expecting to be thanked for what they had done. He inclined to the opinion that the thanks of the citizens were due the Society, for affording them such an opportunity for pleasant and profitable enjoyment, after which the Society adjourned *sine die.*

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STATE BOARD OF HORTICULTURE.

At 2:30 P. M., the Board of Horticulture was called to order by President Johnson.

The following bills were allowed, and the Secretary authorized to draw his warrant on the Treasurer for the same:

Montgomery County Horticultural Society, for expenses of room, etc.	$25 00
Dr. A. Furnas, expenses to Illinois meeting	27 05
Sylvester Johnson, expenses as President	10 00
Mrs. Louise V. Boyd, expenses to Ohio meeting	8 60
D. E. Hoffman, expenses on committees	8 70
J. W. Ragan, Assistant Secretary	10 00
C. M. Hobbs, expenses on committees	3 35

Vice Presidents were selected as follows:

First District—S. Burnett, Vincennes.
Second District—Dr. C. Rathburn, Salem.
Third District—J. W. Ragan, Fillmore.
Fourth District—D. E. Hoffman, Winchester.
Fifth District—W. C. Steele, Laporte.
Sixth District—I. D. G. Nelson, Fort Wayne.

After which the board adjourned.

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APPENDIX.

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REVISED TABLE OF FRUITS

(Revised by a Special Committee)

AND RECOMMENDED BY THE

Indiana Horticultural Society,

AT THE

ANNUAL MEETING AT CRAWFORDSVILLE,

DECEMBER, 1880.

EXPLANATIONS.

N., Northern Indiana; C., Central Indiana; S., Southern Indiana. In the season column S. stands for Summer, A. for Autumn, W. for Winter, E. for Early, L. for Late. In the N., C. and S. column, three dots (...) denote that the variety is unknown, or not fully tested; a dash (—), that it is known but not approved; a star (*), that it is generally approved; two stars (**), much approved, or popular; a dash and star (—*), that it does well in some localities only.

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Revised Table of Fruits, Recommended by the Indiana Horticultural Society.

Number.	Name of Fruit	Dist. North.	Dist. Center.	Dist. South.	Peculiarities of Trees. Trees.	Peculiarities of Trees. Shoots.	Place of Origin.	Peculiarities of Fruit. Season.	Peculiarities of Fruit. Size.	Peculiarities of Fruit. Shape.	Peculiarities of Fruit. Flavor.	Peculiarities of Fruit. Color.	Peculiarities of Fruit. Quality.	Remarks.
	APPLES.													
1	Alexander	*	*	—	Vig. upright, hardy.	Dark	Russia	A	V. large	R. con.	Acid	Red stripe	Poor	Cooking and market.
2	American Beauty	...	...	...	Vigorous	Reddish brown	Mass.	L. W.	Large	R. con.	Sub acid	Red	Good	
3	Am. Golden Russet	*	*	*	Vig. upright, tender	Dark	America	E. W.	Med.	Conical.	Sub acid	Pale Rus't	Best	Table and dessert.
4	Astrachan Red	***	*	*	Vig. upright, hardy.	Reddish brown.	Russia	S.	Large	Flat	Acid	Red stripe	Good	Cooking and market.
5	Am. Sum. Pearmain	*	*	*	Slow g., large tree	Slender	N. Jersey	L. S.	Med.	Round	Sub acid	Striped	Best	Shy bearer, table and dessert.
6	Aut. Seek-no-further	*	*	*	Large, spreading	Slender	Penn	A	Med.	Flat	Sub acid	Striped	V good	Table and kitchen.
7	Aut. Swaar	*	...	...	Vigorous, spreading			A	Large	Flat	Sub acid	Orange	V. good	
8	Am. Pippin	...	—	...	Thrifty, spreading			L. W.	Small	Oblate	Acid	Dull red	Poor	Late keeper, good for cider
9	Bailey's Sweet	*	*	*	Vigorous	Dark	N. York	L. A.	Large	Round	Sweet	Striped	Good	Kitchen, table and stock.
10	Baldwin	***	*	—	Vig. upright, spread	Reddish Brown	N. Eng.	E. W.	Large	Roun'h.	Acid	Red stripe	Best	Table and market.
11	Bellflower, Yellow	*	*	—	Mod. grower, spread	Yellowish	N. Jersey.	E. W.	Large	Oblong	Acid, rich.	Yellow	Best	Best on poor soil.
12	Benoni	*	*	*	Good grower, up'ght	Slender, brown	Mass.	L. S.	Med.	Conical.	Sub acid	Striped	Best	Dessert, kitchen and market.
13	Belmont	*	*	—	Mod. grower, spread	Light olive	Penn.	E. W.	Med.	Flat	Sub acid	Yellow	Best	Tree tender.
14	Ben Davis	***	***	***	Upright, vigorous	Reddish brown	Ky.	W.	Large	Conical.	Sub acid	Striped	Medium	Fine appearance, val. for m'ket.
15	Broadwell	...	*	*	Vig. and spreading.	Light yellow	Ohio	W.	Large	Ob. con.	Sweet	Yel. blush	Best	Table and kitchen.
16	Buckingham	...	*	*	Vig. and upright	Dark red	Virginia	A	Large	Conical.	Sub acid	Striped	Good	Fall Queen of some.
17	Bentley's Sweet	...	...	*	Vig., hardy		Virginia	W	Med.	Roun'h.	Sweet	Yellow	Good	
18	Black Gilliflower	*	...	...	Poor grower			E. W.	Med.	Oblong	Sub acid	Dark r	Good	Cultivated for market in north.
19	Blue Pearmain	...	...	...	Strong grower			E. W.	Large	Conical.	Sub acid	Red str	Good	Little cultivated in the west.
20	Carolina Red June	*	*	*	Light grower, up'r't	Slender, dark	N. C.	E. S.	Small	Oblong	Sub acid	Red	Good	Liable to scab.
21	Cooper	*	...	...	Vig., upright		N. Eng.	W.	Large	Oblate	Sub acid	Yellow	Good	Esteemed by some for market.
22	Canada Reinette	...	...	...	Vig, spreading	Reddish brown	Europe	E. W.	V. large	Oblate	Sub acid	Gr. yellow	V. good	Dessert and market.
23	Clayton	...	*	...	Vig. and upright	Yellowish	Indiana	L. W.	Large	Ob. con.	Acid	Dull red	Good	Kitchen and market.
24	Chenango Strawberry	*	*	*	Vig., upright	Olive	N. York	E. A.	Med.	Oblong	Sub acid	Red stripe	Good	Early and abundant bearer.
25	Duchess of Oldenburg	*	*	*	Good grower, spread	Stout, brown	Russia	L. S.	Med.	Flat	Tart	Striped	Good	Cooking and market.
26	Domine	*	*	...	Vig., spreading	Stout	America	W.	Med.	Flat	Sub acid	Gr. red	Good	
27	Detroit Black	*	...	...	Mod. gr. round-nead	Pale olive	America	E. S.	Med.	Rou. obt	Sub acid	Light yel.	Poor	Early, popular, good for market.
28	Duch. Mignonne	*	...	...	Mod. vigorous	Dark brown	Holland	E. W.	Med.	Round	Sub acid	Yellow	V. good.	
29	Early Harvest	***	***	***	Spreading	Pale olive	N. York	S.	Med.	Flat	Acid	Yellow	Best	Table and market.
30	Early Pennock	*	*	*	Upright	Erect, dark	America	S.	Large	Round	Acid	Striped	Poor	Market and cooking.
31	Early Joe	*	*	—	Slow grower		N. York	S.	Small	Oblate	Acid	Red stripe	Good	Dessert and kitchen.
32	Eng. Russet	*	*	*	Vig., spreading	Stout, dark	England	W.	Med.	Round	Sub acid	Russet	Good	Market and kitchen.
33	Early Strawberry	...	*	...	Vig., upright	Dark	N. York	S.	Med.	Conical.	Sub acid	Red sp't	V. good	Dessert and market.
34	Fallawater	*	*	*	Vig., spreading, tend	Stout, dark	Penn.	E. W.	Large	Rou. con	Sub acid	Yel. green	Good	Good market.

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35	Fall Orange	*			Strong, erect	Dark brown	Mass	A	Large	Roun'h.	Sub acid	Pale yel	Poor	Cooking and market.
36	Fall Pippin	*	*	*	Vig. and spreading	Stout, dark	America	A	Large	R con	Acid	Yellow	Best	Dessert and market, poor bearer.
37	Fall Wine	*	***	***	Med. spreading	Slender	America	A	Medium	Flat	Sub acid	Red, str	Best	Occasionally scabs.
38	Fameuse	*			Moderately vigor's	Reddish brown	Canada	W	Medium	Flat	Sub acid	Red, str	Good	Table and market.
39	Fulton		*		Vigorous, upright	Slender, l't b'wn	Illinois	A	Large	Conical.	Acid	Yellow	Good	Dessert and market.
40	Gilpin	*	*	*	Moderately spread'g	Slender, dark	Virginia	L. W	Medium	R. Obt'e	Sub acid	Striped	Poor	Cider and stock.
41	Golden Sweet	*	***	***	Vigor'us, straggling	Reddish brown	Conn	S	Large	Round	Sweet	Yellow	Good	Baking, market and stock.
42	Gravenstein	*	*	*	Vigorous, spreading		Germany	L. S	Large	Flat	Tart	Striped	Good	Table and kitchen, shy bearer.
43	Gabriel				Slender			A	Medium	Oblate	Sub acid	Light yel.	Good	But little grown in Indiana.
44	Gloria Mundi	—	*	*	Vigorous, spreading		Europe	A	V. large	R Obt'e	Sub acid	Yellow	Poor	Drying and stock.
45	Grimes' Golden	***	***	*	Vigorous, spreading	Dark brown	Virginia	E. W	Medium	Oblate	Sub acid	Yellow	Best	Table, dessert and market.
46	Hagloe	*	*		Vig., open head	Stout and blunt	N. Jersey	S	Large	Round	Acid	Striped	Good	Kitchen and market.
47	Hoop		*	*	Vigorous, upright	Slender	Penn	L. W	Medium	Flat	Sub acid	Striped	Good	Twig blights.
48	Hightop Sweet	*	*	*	Vigorous, upright	Dark	Mass	S	Medium	Round	Sweet	Yel. green	Good	Dessert and stock.
49	Hubbertson's Nonesuch	*	*		Vigorous, hardy	Dark	Mass	E. W	Large	R. con	Acid	Striped	V. good	Table and market.
50	Horse		***	*	Vigorous, upright	Light brown	N. C	E. A	Large	R con	Acid	Yellow	Good	Cooking and drying.
51	Indiana Favorite	*	***		Moderate grower	Dark red	Indiana	W	Medium	Flat	Sub acid	Red	Good	Table and market.
52	Jersey Black	*	***	***	Small, spreading	Slender	N. Jersey	E. W	Medium	Round	Sub acid	Dark red	Good	Kitchen and market.
53	Jarminite		*		Vigorous, spreading	Slender	Ohio	L. W	Medium	R. Obt'e	Sub acid	Striped	Good	Table and market.
54	Jonathan	*	*	*	Moderately spread	Slender	N. York	W	Medium	Oblong	Sub acid	Red	Best	Table and market.
55	Jersey Sweet			*	Moderately vigorous	Dark brown	Unknown	L. S	Medium	Roun'h.	Sweet	Light yel.	Good	Dessert and stock.
56	Keswick Codling		*		Vigorous	Dark	England	E. A	Medium	Oblong	Acid	Yellow	Poor	Cooking.
57	King of Tompkins County	*	*	—	Vigorous, spreading	Stout and dark	N. York	W	Large	Round	Sub acid	Red, str	Good	Kitchen and market.
58	Kirkbridge White		*		Vigorous, hardy		England	A	Large	Conical.	Acid	Yellow	Good	Kitchen and market.
59	Large Yellow Bough	*	*	*	Mod gr., compact	Light green	America	S	Large	Conical	Sweet	Yellow	Good	Market and stock.
60	Ladies' Sweet	*	—	*	Thrifty	Dark	N. York	W	Large	Round	Sweet	Striped	Good	Baking.
61	Late Strawberry		*		Vigorous, upright	Reddish brown	N. York	L. A	Medium	Round	Sub acid	Striped	V. good	Dessert
62	London Sweet				Vigorous, upright		Ohio	W	Large	Flat	Sweet	Yellow	Good	Best for baking.
63	Lowell	*			Vig, round head	Slender	Penn	A	Large	Round	Sub acid	Yellow	V. good.	Cooking, drying and market.
64	Lawver				Vigorous, spreading		Kansas	W	Large	Round	Sub acid	Red	Good	Market.
65	Missouri Pippin													
66	Maiden's Blush	***	***	***	Mod. grower, open	Slender	N. Jersey	A	Medium	Flat	Acid	Blush	Good	Cooking and drying.
67	McAfee's Nonsuch	*	*	*	Vigorous, upright	Yellowish	Kentucky	W	Large	Glob'lar	Acid	Striped	Good	Market.
68	Mellon		*		Vigorous, spreading	Reddish brown	N. York	E. W	Large	Glob'lar	Acid	Red, str	Good	Kitchen and market.
69	Milam	*	*	*	Vigorous, upright	Reddish	South	W	Small	Conical	Sub acid	Red, str	Good	Dessert.
70	Mother	*			Moderately vigorous	Grayish brown	Mass	E W	Medium	Roun'h.	Sub acid	Red, str	Best	Dessert.
71	Moore's Sweet	*	***	***	Moderate grower	Dark olive	America	W	Large	Flat	Sweet	Purple r'd	Good	Baking and cider.
72	Mann				Vigorous, upright	Slender	N. York	L. W	Large	Oblate	Acid	Yellow	Good	New.
73	Newtown Pippin	*	*	—	Large, spreading	Reddish	N. York	L. W	Medium	R. Obl'g	Acid	Yellow	Best	Dessert.
74	Northern Spy	***	*	—	Large, upright	Reddish	N. York	W	Large	R., Ob. C	Acid	Striped	Good	Dessert and market.
75	Ortley	*	*	—	Upright	Slender	N. Jersey	E W	Large	Oblong	Acid	Yellow	Good	Dessert.
76	Peck's Pleasant	*	*	*	Healthy, spreading		R. Island	E. W	Medium	Round	Sub acid	Yellow	V. good.	Kitchen and market.
77	Porter	*	*	*	Vigorous, healthy	Slender	Mass	A	Large	Oblong	Sub acid	Yellow	V. good.	Table and market
78	Pryor's Red	—	—	*	Slow gro'er, upright	Reddish olive	Virginia	W	Medium	R. Con	Sub acid	R. russet	V. good.	Affected by soil.
79	Primate				Strong and stocky	Reddish brown	Unknown	L. A	Medium	Round	Sub acid	Yellow	V good.	Amateur.
80	Pewaukee													
81	Pennock	—	*	*	Strong, vigorous	Reddish brown	Penn	W	Large	Oblique	Sub acid	Red	Good	Market.
82	Pickard	*	*		Upright, vigorous	Yellowish	Indiana	E. W	Large	Round	Sub acid	Yellow	V. good.	Dessert.
83	Rambo	***	***	***	Vig. grower, tender	Dark	Penn	A	Medium	Flat	Sub acid	Gray, red.	V. good.	Table and market.
84	Ramsdell's Sweet	*			Vigorous, upright	Slender, reddish	Conn	A	Large	Oblong	Sweet	Dark red	Good	Baking and stock.

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Revised Table of Fruits, Recommended by the Indiana Horticultural Society—Continued.

Number.	Name of Fruit.	Dist. North.	Dist. Center.	Dist. South.	Peculiarities of Trees. Trees.	Peculiarities of Trees. Shoots.	Place of Origin.	Peculiarities of Fruit. Season.	Peculiarities of Fruit. Size.	Peculiarities of Fruit. Shape.	Peculiarities of Fruit. Flavor.	Peculiarities of Fruit. Color.	Peculiarities of Fruit. Quality.	Remarks.
	APPLES.													
85	Rawles' Janet	...	*	**	Thrifty, spreading	Grayish	Va	L. W.	Med	Conical	Sub acid	Striped	Good	Dessert, market and cider.
86	Red Canada	***	*	*	Moderate	Slender	Mass.	W.	Med	Conical	Sub acid	Striped	Best.,	Table and market.
87	Rhode Island Greening	*	—	—	Crooked, spread, t'r	Stout and dark	R. I	E. W.	Large	Flat	Acid	Green	V. good	Drops from trees.
88	Roman Stem	*	*	...	Mod., vigorous	Slender	N. J.	W.	Med	Ob. Con.	Sub acid	Yellow	Good	Dessert.
89	Rome Beauty	***	***	***	Thrifty, round-head	Slender	Ohio	W.	Large	Ro. Con.	Sub acid	Striped	Good	Market and dessert.
90	Red Stripe	*	***	*	Thrifty, up'ght, h'y	Downy	Ohio	S.	Med	Conical	Acid	Striped	Good	Kitchen and market.
91	Spitzenburg, Newtown	*	*	...	Vig., upright	Olive	N. Y.	E. W.	Med.	Round	Sub acid	Red	V. good	Dessert and kitchen.
92	Spitzenburg, Esopus	*	—	—	Vig., tender	Dark	Mass	E. W.	Large	Conical	Sub acid	Red	V. good	Dessert and kitchen.
93	Summer Rose	...	*	...	Moderately Vigor's.			S.	Small	Round	Acid	Striped	Good	Dessert.
94	Smith's Cider	***	***	***	Vig., spread., tender	Slender, redish	Pa	W.	Large	Ro. Con.	Sub acid	Striped	Good	Market and cooking.
95	Summer Queen	*	*	*	Vig., spreading	Slender, green	N. Y.	S	Med	Conical	Acid	Striped	V. good	Kitchen and market.
96	Swaar	*	*	—	Vig., spreading	Stout, dark	N. Y.	W	Large	Round	Sub acid	Yellow	V. good	Table.
97	Stark	*	*	*	Vig, round-head	Stout, dark	Ohio ?	W	Large	Round	Sub acid	Dull Red	Good	Kitchen and market.
98	Smoke-house	...	...	...	Vig., spreading	Dark brown	Penn	E W	Med.	Round	Sub acid	Red	Good	Culinary uses.
99	Sops of Wine	...	*	...	Vig., upright		Europe	A	Med.	Round	Sub acid	Striped	Good	Amature.
100	St. Lawrence	...	*	...	Vig., uptight	Redish brown	Unknown	A	Med.	Round	Acid	Striped	Good	
101	Summer Rambo	...	...	...	Vig, spreading		France	A	Med.	Round	Acid	Striped	Good	Market and kitchen.
102	Talman's Sweet	*	*	*	Vig., spreading	Yellowish	R. I.	W	Med.	Round	Sweet	Yellow	Good	Baking and stock.
103	Trenton Early	*	***	*	Vig., spreading		Unknown	S.	Large	Conical	Acid	Yellow	Good	Dessert and cooking.
104	Twenty Ounce	*	*	...	Thrifty, round-head	Redish brown	Conn.	A	Large	Conical	Acid	Striped	Good	Market, cooking and drying.
105	Tetofsky	...	...	...	Vig., round-head	Redish browd	Russia	S.	Small	Round	Acid	Striped	Good	Market and kitchen.
106	Victuals and Drink	*	*	...	Vig., spreading	Slender	N J.	A	Large	Conical	Sweet	Gr. Yellow	Best	Table, baking and stock.
107	Vandever Pippin	*	*	*	Vig., spreading	Yellow, brown	Unknown	W.	Large	Flat	Acid	Gray	Good	Unsurpassed for cooking.
108	Wagener	*	*	...	Thrifty, upright	Stout	N. Y	E. W.	Large	Flat	Sub acid	Red Str	Good	Market and table.
109	WestfieldSeek-no-further	*	*	*	Thrifty, spreading		Conn.	W.	Large	Conical	Sub acid	Striped	Good	Table and market.
110	White Pippin	*	*	*	Vig., upright	Dark, downy		W.	Large	Round	Sub acid	Pale Yel	Good	Table and market.
111	Wine Sap	***	***	***	Vig., straggling	Dark	N. J	L. W.	Med.	Conical	Acid	Red Str	Good	Table, market and cider.
112	Willow Twig	*	*	*	Moderate grower	Olive brown	Va.	L. W.	Large	Ro. Con.	Acid	Striped	Good	Table and market.
113	Winter Sweet Paradise	...	...	...	Upright, vigorous	Reddish gray	Penn	W.	Med.	Round	Sweet	Yellow	V. good	Dessert and baking.
	PEARS.													
1	Bartlett	***	***	***	Vig., upright	Yellowish	England	Au., Sep	Large	obl. obt.	Juc. sb ac.	Yellow	V. good	Table, market—very productive.
2	Belle Lucrative	*	*	*	Moderate, upright	Yellowish gray	Belgium	Au., Sep	Med.	obt. pyr.	Sweet	PaleGreen	Best	Table.
3	Beurre d'Anjou	*	***	...	Pyramidal	Light green	France	Sep., Oct	Large	obt pyr	Vinous	Yellow	Best	Table and market.
4	Beurre Diel	...	—	...	Large, irregular	Dark gray	France	Sep, Oct	Large	obt. pyr.	Sweet	Yellow	V. good.	In co'd soils, coarse.

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5	Beurre Gifford			*		Straggling	Slender, reddish	Europe	Ju. Aug.	Medium	Turb'te.	Vinous	Blush	V. good.	
6	Blood Good			*		Moderate grower	Reddish brown	N. York	August	Medium	Turb'te.	Aromatic.	Yellow	Best	
7	Beurre Clairgeau			*	*	V. vig. pry., produc.	Reddish brown	France	Oct. Jan	Large	Pyrif'm	Sug. vin	Yel. crim.	Good	Early bearer, one of most beautf'l
8	Beurre Bosc		*	*		Vigorous	Brownish olive	France	October	Large	Pyrif'm	Buttery	Cinnam'n	Best	Poor bearer.
9	Buffam		*	*		Erect, vigorous	Reddish	R. Island.	Sept.	Medium	Obovate	Sweet	Russet	Good	Fruit variable in quality.
10	Clapp's Favorite		*	*		Vig., upright, spr'g.	Reddish brown	Mass.	August	Large	Obt. pyr	S. vinous	Yel. blush	V. good.	Very productive, m'k't and table
11	Doyenne d'Ete		*	*		Vigorous, upright	Brownish red	Europe	July	Small	Obovate	Sweet	Yellow	V. good.	Dessert, early bearer.
12	Doyenne White		*	*	*	Vigorous, upright	Yellow gray	Europe	Sep. Oct.	Medium	Obovate	Sweet	Yellow	Best	Cracks in some localities.
13	Doyenne Gray			*		Vigorous, upright	Gray brown	France	October	Medium	Obovate	Delicious	Russet	V. good	Family and market.
14	Doyenne Boussock			*		Vigorous	Diverging	Belgium	Sep. Oct.	Large	Pyrif'm	Sweet	Russet	Best	Dessert and market.
15	Dearborn's Seedling			*			Reddish brown	Mass.	August.	Small	Rd. pyr.	Sweet	Yellow	Best	Dessert.
16	Early Catherine		*	*	*	Slender branches	Reddish brown	France	August	Small	Pyrif'm	Sweet	Yellow	Good	Apt to rot at the core.
17	Flemish Beauty	*	*	*	*	Vigorous, spreading	Dark brown	Europe	Au. Sept	Large	Obovate	Sweet	Greenish	Good	Table and market, bears early.
18	Glout Morceau			*		Spreading	Dark olive.	Belgium	Dec	Large	Irreg'r	Sweet	Yellow	Good	Table and market.
19	Howell		*	*	*	Upright and vig.	Reddish brown	Conn.	August	Large	Rd pyr.	Vinous	Yellow	Good	Market and table.
20	Julienne				*	Vigorous, upright	Yellow brown		July	Small	Obovate	Variable.	Yellow	Good	Val. only in dry, warm soil.
21	Lawrence	*	*	*		Moderately vig.	Dull yellow	N. York	Nov.	Medium	Ob. pyr.	Sweet	Yellow	V. good.	A most valuable late variety.
22	Madeline		*			Vigorous	Olive	France	July	Small	Ob. pyr.	Sweet	Yel. green	V. good.	Dessert.
23	Mount Vernon		*			Vigorous	Reddish brown	Mass.	Oct.	Medium	Obt. pyr	Vinous	Russet	V. good	Dessert and market.
24	Onondaga		*	*		Vigorous, product	Olive brown	Conn.	Sept.	Large	Pyrif'm	Vinous	Yellow	Good	Market.
25	Rostiezer		*			Straggling	Olive	Europe	Aug.	Small	Oblong.	Sweet	Brownish	V. good.	Dessert.
26	Seckle	*	*	*	*	Compact	Dark	America	Aug.	Small	Obovate	Sweet	Brownish	Best	Dessert and market.
27	Sheldon	*	*	*	*	Vigorous, erect	Yellow	N. York	Aug.	Large	Obtuse	Sweet	Russet	Best	Dessert, market and kitchen.
28	Souvenir DeCongres					Vigorous, upright		France	Aug.	Large	Obl. pyr	Sweet	Yellow	Good	
29	Tyson	*	*			Upright, vigorous	Olive yellow	Penn.	Aug.	Medium	Ac. pyr.	Sweet	Br. Russet	Best	Dessert.
30	Vicar of Winkfield	*	*	*		Vig., straggling	Dark olive	France	Nov.	Large	Long.	Sprightly.	Pale yel	Good	Market and kitchen.
31	Winter Nellis		*			Vig., straggling	Reddish brown	Belgium	Dec	Medium	Obovate	Sweet	Russet	Best	Dessert.
	DWARF PEARS.														
1	Bell Lucrative	*	*			Moderate, upright	Yellowish gray	Belgium	Aug.	Medium	Ob. pyr.	Sweet	Pale green	Best	Table.
2	Beurre d'Anjou	*	*	*		Pyramidal	Light green	France	Sept.	Large	Ob. pyr.	Vinous	Yellow	Best	Table and market.
3	Clapp's Favorite		*			Vig, upright, spr'g.	Reddish brown	Mass.	Aug.	Large	Obt. pyr	S. vinous	Yel. blush	V. good.	Very productive, m'k't and table
4	Duchess d'Angoulemme	*	*	*	*	Strong	Reddish yellow.	France	Aug.	Large	Obovate	Vinous	Yellow	Good	Market.
5	Doyenne d'Ete		*			Vigorous, upright	Reddish yellow.	Belgium	July	Small	Obovate	Sweet	Yellow	V. good.	Dessert.
6	Louise Bonne d'Jersey	*	*	*	*	Vigorous, upright	Reddish brown	France	Aug.	Medium	Obl. pyr	Sweet	Br. red	Good	Market and kitchen.
7	Vicar of Winkfield	*	*	*		Vig., straggling	Dark olive	France	Nov.	Large	Long.	Sprightly.	Pale yel	Good	Market and kitchen.
	PEACHES.														
1	Alexander							England	July	Large	Round	Vinous	Pale red	Good	Globose glands, flowers large.
2	Amsden				*										
3	Crawford's Early	*	*		*	Vig., strong wood	Yellowish red	N. Jersey	Aug.	V. large	Oblong.	Sweet	Yel. red	V. good.	Globose glands, flowers small.
4	Crawford's Late	*	*	*	*	Vigorous	Yellowish red	N. Jersey.	Sept.	V. large	Oblong.	Vinous	Yel. red	Good	Globose glands, flowers small.
5	Columbia					Moderately vig.	Purple	N. Jersey.	Sept.	Large	Glob'l 'r	Sweet	Red	V. good.	Reniform glands, flowers small.
6	Early Beatrice							England	July	Medium		Sweet	Red	Good	Reniform glands, flowers large.
7	Early Louise							England	July	Small		Sweet	Bright red	Good	Reniform glands, flowers small.
8	Early Rivers							England	July	Large		Vinous	Yellow	V. good.	Reniform glands, flowers large.
9	Early Tillotson					Slow grower		N. York	Aug.	Medium	Round.	Sweet	Pale red	Good	Glandless, flowers small.
10	Fleenor Cling			*		Vigorous	Light red	Indiana	Sept.	Large	Oblong.	Sweet	Pale red	V. good.	Canning and market.
11	Foster														
12	George the Fourth	*	*	*											
13	Gross Mignonne		*	*		Vig., spreading	Reddish	France	Sept.	Large	Round.	Vinous	Pale red	Best	Glands globose, flowers small.
14	Governor Garland														

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Revised Table of Fruits, Recommended by the Indiana Horticultural Society—Continued.

Number.	Name of Fruit.	Dist. North.	Dist. Center.	Dist. South.	Peculiarities of Trees. Trees.	Peculiarities of Trees. Shoots.	Place of Origin.	Peculiarities of Fruit. Season.	Peculiarities of Fruit. Size.	Peculiarities of Fruit. Shape.	Peculiarities of Fruit. Flavor.	Peculiarities of Fruit. Color.	Peculiarities of Fruit. Quality.	Remarks.
	PEACHES.													
15	Hale's Early	*	*	*										
16	Honest John		*	*										
17	Heath Cling	*	*	***										
18	Heath Free			*										
19	Honeywell													
20	Morris' White		*		Vigorous	Light red	America	Aug	Large	Round	Sweet	White	Good	Glands reniform, flowers small.
21	Morris' Red		*	*	Vigorous	Bright red	America	Aug	Large	Round	Vinous	Red	Best	Glands reniform, flowers small
22	Oldmixon Cling	*	*	*			Europe	Sept	Large	Oblong	Sweet	Yellow	V. good.	Glands globose, flowers small.
23	Oldmixon Free	*	*	***			America	Aug	Large	Round	Sweet	Pale Yel	V. good.	Glands globose, flowers small.
24	President						N Y	Sept	Large	Oval	Sweet	Pale Yel	Good	Glands globose, flowers small.
25	Smock's Free	*	*	***			N. J	Sept	Med	Oval	Vinous	Yellow	Good	Glands reniform, flowers large.
26	Stump the World			*			N. J	Sept	V. large	Round	Sweet	White	Good	Glands globose, flowers small.
27	Troth's Early		*	*			N. J	Aug	Med.	Round	Sweet	Light red	Good	Glands globose, flowers small.
	PLUMS.													
1	Damson		*	***	Slender, upright	Purple	America	Aug	Small	Oval	Acid	Blue	Good	Productive and valuable.
2	Wild-goose	*	*	*	Vigorous, spreading	Redish	America	Aug	Large	Round	Acid	Purple	Good	Said to be Curculio proof.
	CHERRIES.													
1	Early May	***	***	***	Vigorous, spreading	Grayish	America	June	Med	Round	Acid	Light red	Good	Market and kitchen.
	QUINCES.													
1	Orange	*	*	*	Slender, spreading	Dark		Sept	Large	Round	Acid	Orange	V. good.	Canning and market.
2	Rea's Seedling		*	*	Vigorous	Dark	N. Y.	Sept	V. large	Oval	Acid	Orange	Good	Market.
	GRAPES.													
1	Concord	***	**	***	Vigorous		Mass	Sept.	Large	Glob'lar	Sweet	Black	Good	Market and family
2	Hartford	—	—	*	Vigorous		Conn	Aug	Med	Glob'lar	Sweet	Black	Good	Drops badly from the bunch.
3	Ives	*	*	*	Vigorous		Ohio	Aug	Med	Oval	Sweet	Black	Good	Market and family.
4	Delaware	—	*	—	Slender		Ohio	Sept	Small	Round	V. sweet.	Light red	Best	Dessert and family.
5	Clinton	*	*		Strong		N. Y.	Sept	Small	Round	Acid	Black	Good	Kitchen.
6	Moon's Early													
	CURRANTS.													
1	Cherry		*		Strong	Stocky	Italy	Early	V. large	Round	Acid	Dark red	Good	Market.
2	Red Dutch	**	*	*	Thrifty	Slender		Med	Med	Round	Acid	Red	Good	Best for general purposes.
3	LaVersaillaise				Stocky	Erect	France	Late	Large	Round	Acid	Dark red	Good	Market and family.
4	White Dutch		*		Vigorous	Erect		Early	Med	Round	Sub acid	White	Good	Family.
5	White Grape		*		Vigorous	Strong		Med	Large	Round	Sub acid	White	Best	Amateurs.

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	Gooseberries.														
1	Houghton	*	*	*	Vigorous, spreading	Slender	Mass.	Med.	Small	Oval	Acid	Red	Good	Kitchen and market
2	Mountain Seedling	...	*	...	Strong, spreading	Purple	Tenn.	Late	Med	Oval	Acid	Brown	Good	Poor bearer.
3	Downing	...	...	...	Strong	Short	N. York	Late	Med	Oval	Acid	Light red.	Good	Very little grown.
4	Smith's Imperial	...	...	...	...	...	...	...	...	...	...	...	...	
	Raspberries.													
1	Doolittle	*	—	...	Sraggling	Very thorny	N. York	Early	Med	Flat	Sub acid	Black	V. good.	Not valuable.
2	Mammoth Cluster	*	***	*	Strong	Thorny	...	Med	Large	Flat	Acid	Black	Good	Valuable.
3	Miller's Daily	...	...	...	...	...	...	...	...	...	...	...	...	
4	Gregg	***	***	***	Vigorous and hardy.	Strong	Indiana	Med	V large	Round	Acid	Black	Good	The most valuable black cap.
5	Turner	*	...	...	Vigorous	...	Illinois	...	Large	Oval	Sweet	Red	Good	Propagates by suckers.
	Blackberries.													
1	Snyder	*	*	...	Very hardy	Strong	Indiana	...	Med	Oval	Sweet	Black	Good	Hardy and free from rust.
2	Taylor's Prolific	...	*	...	...	...	Indiana	...	Med	...	...	...	...	Very hardy.
	Strawberries.					**Foliage.**								
1	Capt. Jack	*	*	*	...	...	...	...	...	...	...	...	...	
2	Crescent	*	*	*	...	...	...	...	...	...	...	...	...	
3	Cumb. Triumph	...	***	...	...	...	...	...	...	...	...	...	...	
4	Downer's Prolific	...	...	...	Vigorous	...	Kentucky	Early	...	...	...	...	...	
5	Green Prolific	*	*	...	Vigorous	Light green	N. Jersey.	Late	Large	Round	Acid	Pale red	Good	Plant, pistilate.
6	Monarch	*	...	...	...	...	...	...	...	...	...	...	...	
7	Kentucky	*	*	*	Vigorous	Dark green	Kentucky	Late	Large	Conical.	Sub acid	Light red.	Good	Hermaphrodite.
8	Sharpless	...	...	...	...	...	...	...	...	...	...	...	...	
9	Wilson's Albany	***	***	*	Feeble	Dark green	N. York	Med	Large	Conical	Acid	Dark red.	Good	Hermaphrodite.

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MEETING OF THE EXECUTIVE COMMITTEE

OF THE

INDIANA HORTICULTURAL SOCIETY.

The Executive Committee of the Indiana Horticulture Society, met in obedience to a call of the President, in the Society's room in the city of Indianapolis, November 18, 1880. President Johnson, J. C. Ratliff, D. E. Hoffman, J. W. Furnas and W. H. Ragan were present.

The immediate object of the session being the arrangement of a programme for the annual meeting of the Society, to be held in the city of Crawfordsville December 21, 22, 23, 1880, it was, on motion of J. W. Furnas, agreed that the following order of exercises would be observed in conducting said meeting.

TUESDAY, DECEMBER 21, A. M.

TEN O'CLOCK:—Welcome address and response.
President's annual address and reports of officers.

TUESDAY, P. M.

HALF-PAST ONE O'CLOCK:—How to Make our Society Attractive to the Young; paper by Prof. C. L. Ingersoll, of Purdue.
Discussion led by Dr. A. Furnas, of Danville.
Reports by the First and Second Vice Presidents.

TUESDAY EVENING.

SEVEN O'CLOCK:—Relation of the Scientific to the Practical in Botany; paper by Prof. John M. Coulter, of Wabash College.
Discussion led by Prof. R. T. Brown, of Indianapolis.
Report of the Ohio meeting by Mrs. Louise V. Boyd, of Dublin.

WEDNESDAY DECEMBER 22, A. M.

NINE O'CLOCK:—Small Fruits; paper by G. Cowing, Muncie.
Discussion led by Jos. Gilbert, of Terre Haute.
Reports by Third and Fourth Vice Presidents.

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WEDNESDAY, P. M.

HALF-PAST ONE O'CLOCK:—The Trees; paper by Dr. J. A. Warder, Ohio.
Discussion led by J. C. Ratliff, Richmond.
Indiana Weeds; paper by Prof. A. W. Brayton, Indianapolis.

WEDNESDAY EVENING.

SEVEN O'CLOCK:—Blight or Bacteria Ferments of Trees; paper by Prof T. J. Burrill, of Illinois Industrial University.
Discussion led by Wm. A. Ragan, Clayton.
Report of the Kentucky meeting by E. Y. Teas, Dunreith.

THURSDAY, DECEMBER 23, A. M.

NINE O'CLOCK:—Report of the Illinois meeting, by Dr. A. Furnas, Danville.
Reports of Fifth and Sixth Vice Presidents.
Report of the Mississippi Valley Horticultural Society, by W. H. Ragan, Clayton.

THURSDAY, P. M.

HALF-PAST ONE O'CLOCK:—This session will be devoted to miscellaneous and unfinished business, fixing the place of the next meeting, and adjournment, after which the State Board of Horticulture will hold a business session.

The propriety of supplying the members elect of the Legislature by mail, with copies of the Transactions for 1879, after a brief discussion, was considered advisable and the Secretary was so ordered.

The action of the President and Secretary, in having certain volumes that were liable to damage and loss, substantially bound for the Library, was approved.

The President and Secretary were authorized to convene the Committee appointed at the last annual meeting of the Society, consisting of Dr. Furnas, D. E. Hoffman and C. M. Hobbs, for the purpose of thoroughly revising the Star Fruit List, the same to be subject to the approval and adoption of the society at its meeting at Crawfordsville.

The Committee will meet at the Societys room in Indianapolis, November 26 and 27, the Executive Committee appropriating money for the purpose of defraying necessary expenses.

W. H. RAGAN, *Secretary.*

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LETTER FROM CHARLES LOWDER.

SALEM, HENRY COUNTY, IOWA, DEC. 9, 1880.

W. H. Ragan, Secretary Indiana Horticultural Society:

MY DEAR FRIEND: As the time has been approaching for the annual meeting of the Horticultural Society, my mind has often wandered back to the many pleasant hours that I have spent in that body, and the friendship and high regards I have entertained for many of its members. My thoughts on the subject have finally culminated in the conclusion to send a small collection of our Iowa apples to your meeting. Not that I would enter for any of the premiums offered, but that I might demonstrate my remembrance of old friends. The apples sent are not good samples, or, such as might have been selected, had I aimed sooner to have sent the collection. The samples were taken this week from the bulk in the bins in the cellar, and that too with but little culling over. I believe they are all true to name, and a fair representation of the varieties mostly grown as winter apples in this vicinity.

To say that Iowa is a fruit growing State, only feebly tells the truth. It is a *great* and *good* fruit growing State, one of the best in the Union, not only for quality of fruit, but also of quantity. The trees grown in orchards in this part of the State—apples, peaches, pears and cherries, are more hardy and fruitful than the same varieties in Central Indiana. In the last seven years there has not been any thing like a short crop of either apples or cherries, and only twice a clear failure of peaches. Even in 1875, when all kinds of fruit was so very badly injured with the 16th of April freeze in Indiana, they had here a very full crop of all kinds of fruit, even peaches. This last October, apples were sold at Mt. Pleasant, our county seat, on the C., B. & Q. railroad, by the car load, for twenty-five cents per bushel, and sweet cider at eight cents per gallon, while thousands of bushels of apples lay upon the ground and rotted, or were left to hang on the trees until frozen. Cherries, both Early Richmond and Morellos, sold by the 100 bushels at seventy-five per bushel. At a good paying price, Salem township alone, could have easily marketed 1,000 bushels, after well supplying all home demand.

There are no large orchards in this vicinity, but every farm has a good orchard of well selected fruit. Though many of the orchards are more than thirty years old, yet they are in a good state of preservation, and bear annually good crops of fine fruit. The selections in this vicinity are remarkably good. A good supply of good apples all the year. We run one cider mill last year, and this year two mills—Ragan's press and the Over grinder. This year we have made over 20,000 gallons of cider for our customers, while there was three other common mills soliciting patronage, and doing their share of work. There has been more apples, pears and cherries grown in the last five or six years in Salem township—six miles square—than there has been in any county in Central Indiana in the same time.

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The cars are now whistling in Salem, the engine having reached there today for the first time, on the new road from Keokuk to Mt. Pleasant. It will create a boom in our town. It will give us an outlet north, and a through competing line to St. Louis and one to Chicago. There will be no better place to erect and start either an Alden or a Tilden drying establishment next year than at Salem.

Hoping that you may have a very profitable and happy meeting,

I am very respectfully,

CHARLES LOWDER.

Accompanying the foregoing letter, were the following varieties of apples, which were received in good condition, and formed an attractive feature on the exhibition tables:

Rawles Janet, Swaar, McAfee, Gilpin, Carolines, White Winter Pearmain, Moore's Sweet, Limbertwig, American Golden Russett, Smith's Cider, Stark, Pennock, Michael Henry Pippin, Ortley, Winesap, Bellflower, Northern Spy, Roman Stem, Jonathan, Grindstone, Baldwin, Vandervere Pippin, Rome Beauty, Grimes' Golden, Fallawater, Ben Davis, and one marked unknown, which was not identified by any member of the Society.

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STRAWBERRY CULTURE.

BY H. MANKEDICK.

To the Indiana Horticultural Society:

As I have been a member of this society since the second year of its existence, I deem it my duty to give you some of my experience in growing strawberries, having had some experience since 1852, on a strawberry farm near Pittsburg, Pa. Thinking at that time that perhaps some day I would raise strawberries myself. Moving to Indianapolis in the fall of 1853, and being employed in the Bates House, I saw strawberries brought in every other day, said to be from Winter's strawberry farm northeast of the city. They were brought in by the half dishpanful, small, and in bad condition, which gave me the idea that Indianapolis would be a good place for growing strawberries. But as I did not have the means, I had to wait several years until the necessary money was earned to go into the business. Although I raised some in a little lot for my own use with success, until in the fall of 1857, I bought a small piece of ground southeast of the city, and covered with a dense forest. I went to work at once, chopped off timber, and built a house the same fall. In the spring of 1858, on the first of March, I contracted with a neighbor to clear off three-fourths of an acre within a month, which I wanted for a strawberry patch. I burnt up the brush, and on the first of April, I took a shovel plow, with a coulter, which we called a root jumper, to scratch up the ground; part of it did very well, but most of the roots lay on the top of the ground, and I could not touch it with my root jumper, but I set my plants in rows three feet and a half apart. I stuck the plants between the roots as well as I could. Every plant grew nicely. They were the Early Scarlet, as I had no others. I worked them as well as I could during the summer. The runers ran over the roots and took hold between them. In the fall they had the ground pretty well covered, and I felt proud of my strawberry patch. Neighboring farmers looked at it as a piece of foolishness, and one allowed, if I had sown the piece in wheat, I might have had a fair crop, but I kept silent. Nature provided for them through the winter, covering them up snugly with the forest leaves, as there was timber on three sides of the patch, and in the spring they came out nice and thrifty.

On the 18th of May I picked two half-bushel drawers, or one bushel of berries, and next day, the 19th, I took them to market and opened them out for sale. You ought to have seen the sight. "Hallo, where did those berries come from? Where were they raised? What nice berries." They refused to believe that I had raised them. But very soon I had thirty cents for each quart in my pocket, and that was all I cared for then. The strawberries were nice, large and sweet. My neighbors had by this time gotten a different opinion, and saw that I had not fooled my time away. The second year I

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was equally successful, with three times as much ground planted, and then everybody wanted to raise strawberries. Up to this time I had nothing but the Early Scarlet. I now procured other varieties. Before the Wilson came out I raised the McAvoy's Superior, Longworth's Prolific, and Burr's New Pine. They all did well until we got the Wilson. I will not name all the varieties, as I have tested sixty-five varieties in the first twelve years, and discarded all except Wilson and the Green Prolific. The latter has brought me at least fifty per cent more profit on a given space of ground than the Wilson, but I am now willing to let the Green Prolific slide, and very likely in another year I will say good-by to the Wilson. If so, I will not forget Mr. Wilson, as he has been a good friend of mine, and not of me alone, but of the whole country. But then we live in a country that is progressing from year to year, and we have new friends coming and knocking at our door. One that I have already called in is the Cumberland Triumph. There are others—the Sharpless, Crescent, Captain Jack, Kentucky, Champion, Miner's Great Prolific, Glendale, Photo, etc. As I have not had a fair trial last year, I will not give my opinion until next year. My aim is to raise the most berries with the least work. Suppose I would plant an acre each of Wilson and Cumberland Triumph; have the rows four feet apart and two and a half to three in a row, both varieties alike, and give them the same cultivation; I would not get one-fourth as many berries of the Wilson as I would have of the Cumberland, and besides, the Cumberland will sell at from one-fourth to one-half higher than the Wilson. The Wilson would not cover one-fourth the ground. I set out a patch of them last spring; one-half of them made no runners at all. That is one point I have against it. The second is its tartness. It is true the commission houses like to handle them.

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EXAMINATION QUESTIONS

OF THE

PURDUE UNIVERSITY CLASS IN HORTICULTURE.

[The following is published as an evidence of the practical character of our State Agricultural College under its present management.]

QUESTIONS AT MID-TERM EXAMINATION.

1. Define species and varieties.
2. How produce new fruit by cross-fertilization, and are the resulting fruits new species or varieties?
3. How propagate by layers, by cuttings, and what fruits are propagated in each way?
4. Name four requisites for successful grafting and four kinds of grafting.
5. Give recipes for the best and a poorer quality of grafting wax, and state in what two ways applied.
6. Describe the four methods of grafting, and tell how the scions should be cut and fitted in cleft-grafting, and why.
7. Describe three kinds of budding.
8. When are the various ways of propagation practiced?
9. On what fruits are grafting and budding practiced respectively?
10. How prepare for and set out an orchard?
11. Give the terms used in describing forms of fruit.
12. Explain "cavity and basin."
13. Explain terms used to describe color in fruits.
14. Explain terms used to describe flavor and quality.
15. Classify and give the origin of the Red Astrachan, Duchess of Oldenburg, Winesap and Northern Spy, and give their value for raising in this State.
16. Name one (best) variety of sweet apples for summer, autumn and winter, respectively.
17. Name two varieties of acid apples (best) for summer and autumn respectively, and four varieties for winter.
18. Describe the Ben Davis and give one synonym.
19. Give the general characteristics of the Spitzenberg group, and name the varieties.
20. Give a list of ten varieties of apples for a market orchard near town in Central Indiana.

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21. How vary the above list for Northern Indiana? For Southern Indiana?
22. Give a list for an orchard far from market.
23. What is the greatest drawback to grape culture?
24. The best system of training? The most showy?
25. Name one of the earliest grapes; one of the latest keepers.
26. How does Thomas classify grapes? and how is a bunch when shouldered?
27. Name two American varieties in each division.
28. Name three varieties of the hardiest to raise under glass.
29. From what sources did we obtain our cultivated varieties of strawberries?
30. Name four requisites for strawberry culture (successful), beside good seasons.
31. Name three old standard varieties and four new ones that do well.
32. What differences between the Antwerps or Red and the Black-cap varieties of raspberries?
33. How is each best managed, and what their source?
34. Name two good varieties of each.
35. Name two good varieties of blackberries, two of currants, and one of gooseberries.

SECOND, OR FINAL EXAMINATION.

1. Give two reasons why dwarfs are desirable, and state on what kinds of stocks pears, plums and cherries are worked in order to produce dwarfs in each case.
2. Give Thomas' classification of pears, peaches and cherries.
3. Name two varieties of pears in each division, seven varieties of peaches, two of quinces, five of plums and five of cherries.
4. What soil and surroundings best for a pear orchard? For a peach orchard?
5. Why are fruit buds killed by frost, and why are large bodies of water a protection, if near?
6. State the gardeners' method of propagating plants from seeds, and name two difficulties in particular instances.
7. What is "damping off," and the best preventive?
8. What is bottom heat, its proportion to house heat, and when is it used?
9. How are cuttings of flowers made, and how managed in rooting and potting off?
10. What is forcing? When practiced on carnations, camelias and tuberoses to produce winter bloom?
11. Classify carnations and roses (Breck's Class.).
12. Name four varieties of roses and place in class.
13. Name one good winter-blooming fuchsia.
14. Classify tulips, and explain "breaking" and "getting foul," as florists term it.
15. Give proportional measurements for a good span-roof conservatory.
16. Give accurate data for computing the length of four-inch pipe and the number of square feet of boiler surface necessary to heat any greenhouse to any given temperature when the lowest temperature outside is known and the wind blowing less than five miles per hour.

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17. What is the law in regard to the cooling of glass surfaces, with wind at different velocities, when the temperature is constant?
18. Give the native country of the dahlia. Why its name and when introduced into the United States?
19. Give the ingredients and proportions for a good potting or prepared soil for the largest classes of plants.
20. How vary the proportions for azaleas and other fine-rooted plants?

CLASS MARKINGS ON THE ABOVE.

Beck	75	Boone county	
Driscoll	86	Delaware county	
Knefler	92	Marion county	
Lyons	72	Jay county	Absent one week.
Mead	87	Switzerland county	
Quick	79	Bartholomew county	Sick two weeks.
Ratliff	94	Wayne county	
Roberts	91	Benton county	
Waugh	74	Montgomery county	

I was absent one week out of the fifteen weeks at the State Fair.

C. L. INGERSOLL.

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REPORTS

FROM

LOCAL HORTICULTURAL SOCIETIES.

REPORT FROM PLAINFIELD HORTICULTURAL AND AGRICULTURAL SOCIETY TO THE INDIANA HORTICULTURAL MEETING OF 1880.

The past season has been one of only average prosperity in horticulture in this vicinity. Trees made a fair growth. Pear trees were considerably damaged by blight, and there was some twig blight on the apple trees. Apples dropped badly all through the season, so that few were left for fall gathering, and those are not keeping well.

SMALL FRUITS.

Currants and gooseberries were mostly destroyed by worms. Where these pests were kept off there was an abundance.

Strawberries, a little more than a half crop.

Cherries, a half crop.

Plums, wild ones good; tame ones an average crop.

Raspberries, a half crop.

Blackberries, tame ones one-third crop; wild ones were in abundance.

Peaches were plenty where there were trees.

Pears a fair crop.

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APPLES.

Summer apples one-half crop. Varieties that did best are Prince's Harvest, Kirkbridge White, Red Stripe, Horse Apple and Sops of Wine.

Fall apples three-fifths crop. Varieties that did best are Maiden's Blush, Fall Wine, Rambo and Pottinger.

Winter kinds did poorly. Varieties that did best are Janet, Red Sweet Pippin, Winesap, Newtown Pippin, Indiana Favorite and Jarmanite.

The people have been blessed with good health and are prosperous.

Signed by order of the meeting held December 11, 1880.

AMOS ALDERSON, *President.*

W. H. WHITE, *Secretary.*

Some papers of interest have been presented to the Society, one especially worthy we herewith append:

FARMERS' NEED OF A KNOWLEDGE OF BOTANY.

BY W. H. RAGAN.

The study of botany is the study of nature in her most intimate relations to mankind. That "all flesh is grass" is an axiom of Holy Writ. The philosopher may dig deep into science, the geologist may read the book of creation from the "rocks," the astronomer may explore the mighty firmament, the divine may pry into the mysteries of revelation, and, while each enjoys his privilege and realizes the undoubtable fact that such is food for the mind, yet when this "tenement of clay" calls for refreshments we must come to "grass." Grass, by which is designated the whole botanical world, is primarily the basis of all existence. Strange, therefore, is the fact that the science which underlies our very existence should be so little understood by the masses. Still more strange is it that you, Mr. President, should have selected for your essayist upon this subject one entirely ignorant of botany, as a science; yet, perhaps the selection may be a judicious one, since, who is more competent to discourse upon the "Farmers' need of a knowledge of botany," than one who himself can fully appreciate that need.

My opportunities for a common school education were poor, and did not extend to the study of the pleasing and profitable science of botany; but my practical relations in life have been such as to develop my great *need* of a

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knowledge thereof. And now, having arrived at an age when it will be next to an impossibility for me, amidst the cares and duties of practical life, to acquire such a knowledge of botany as it is my greatest desire to possess; I may very properly be pardoned for presuming to advise others of my class of the great need of knowledge on this subject.

Agriculturists and horticulturists are generally practical men—men who know from experience, rather than from theory—that certain causes are followed by certain results—that a tree, for instance, will grow, as we term it, if its root be placed in properly prepared soil, without which it will not; hence, they very naturally conclude, that it is from the soil that the material that forms wood growth is taken. Botany, or more properly vegetable physiology, teaches us that but a very small per cent. of wood growth is taken from the soil; that the very small amount of inorganic matter that we term ashes, the residue remaining after burning, comes from the earth, and the balance, or volatile matter termed smoke, forming perhaps nine-tenths of the bulk of the tree, is taken from the atmosphere, and that the growth, instead of being laid on by an upward flow of the sap, is exactly the reverse. The foliage of the tree is its workshop, or rather its laboratory, in which the crude sap is prepared for laying on the annual ring of growth in its descending course. What the lungs are to an animal, the leaves are to the tree. Neither could survive without these important organs. They differ, however, very materially in the character of their inhalations and exhalations, the foliage taking up and appropriating that which is cast off by the lungs, and vice versa. What is poisonous (carbonic acid gas) to the lungs, is life to the foliage. Thus we have, in this beautiful arrangement of nature, a compensating medium or balance of forces, just as we find existing in stagnant water, well regulated aquariums, etc., where a balance of forces is kept up by the growth of mosses and aquatic plants, without which the water would be uninhabitable for animal life.

What is true of the tree is true of all plant life. Hence we must see the very great importance of keeping up a healthy growth of foliage in order to secure a healthy plant. If our grape vine, from disease, insects or other cause, casts its foliage prematurely, we get an unhealthy wood as the result. The Clinton and Delaware, from the fact of their having rather tender foliage, are liable to be injured by our autumn suns, and as a consequence, the wood being poorly ripened, are becoming proverbially tender, easily winter-killed, when in reality they are our hardiest vines. Winter-killing, as we term it, is, therefore, not always so much the result of the severity of the weather as it is of the fall growth, and the manner in which certain varieties may have ripened up their previous year's growth explains why the same temperature does not always produce the same results. Without a knowledge of these facts we are sometimes surprised to find 10, or even 8 degrees below zero killing our peaches, while at other times we have full crops of this most luscious fruit after a temperature much below these points.

Again, we are often disappointed with our meagre crop of strawberries, everything appearing favorable, with seasonable weather and good plant growth, when in reality the foundation for a good crop is laid the fall previous, without which it is utterly impossible to have satisfactory results. In

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order, therefore, to understand these matters fully, and to be able to attain the best results from our labors, we need to know something more of the science that lays at the bottom of our operations; and to this end we want to instruct our children in this beautiful branch of scientific knowledge. Botany should be taught in our common schools. Let us have in our schools less of the old hum-drum course, and more of agricultural chemistry and botany, as of far greater value in the practical relations of life. It is to our common schools, then, the great archimedian lever of this age, that we must look for a dissemination of a knowledge of botany amongst the masses. It is true that we, the staid and stoic representatives of the present generation, may add to our meagre store of knowledge of botany, but it is the next generation that we are to expect most of. Pioneer life had its privations, its hardships, its cares and its pleasures, while it afforded but little time for the study of more than the outlines of the more practical branches of education. Our children may drink deeper at the fountain of human knowledge, taking in those branches of learning which have been denied us. Let us give them an opportunity.

REPORT OF THE MONTGOMERY COUNTY HORTICULTURAL SOCIETY.

Hon. W. H. Ragan, Secretary Indiana Horticultural Society:

This is the second year of our organization. We have held several interesting meetings. In bad weather we have held our meetings in the County Superintendent's office, in Crawfordsville. During the nicer portions of the year we have conducted our meetings on the picnic plan, meeting monthly at the residence of some one of our members. These meetings have generally been well attended and of much interest. It has been the duty of some member to read an essay on some appropriate topic at each meeting, which has generally provoked spirited discussion. Our membership fee is $1 per annum, and constitutes our only income.

The officers are: A. J. Royalty, President, Crawfordsville; Prof. D. A. Bassett and J. C. Maxwell, Vice-Presidents; James Calloway, Secretary, Ladoga. I herewith submit some of the essays read before the Society during the year as worthy of publication.

One year ago it was decided to invite the Indiana Horticultural

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Society to hold its annual meeting for 1880 in Crawfordsville, which invitation was accepted, and has resulted very satisfactorily, especially to the citizens of Crawfordsville and vicinity, who have been highly entertained and instructed.

Very respectfully,

JAMES CALLOWAY, *Secretary.*

FIRST ANNIVERSARY OF THE ORGANIZATION OF THE SOCIETY.

PRESIDENT ROYALTY'S ADDRESS.

Ladies and Gentlemen of the Montgomery County Horticultural Society:

Allow me to congratulate you on passing the first milestone or year of our existence. On the first day of March, 1879, a few persons met in the seed store of Mr. Blair, on Green street, to take into consideration the feasibility of organizing a horticultural society. We decided that we would organize, which was done, partially on the 15th and fully on the 22d of the same month. Since then the most of us have met once a month, and I believe our meetings have generally been pleasant to all. As to results, although we can not see that we have accomplished a great deal, I am satisfied that we have done some good. Our society is known farther than many of you would suppose. Wherever I go in this county I hear it spoken of favorably, and even away from home we are not entirely unknown. At our State horticultural meeting I found that our society was known by many of the best horticulturists, and our reputation is fully as good away from home as it is at home. We have no cause to be discouraged.

In most places where societies of this kind have been established many persons have been largely engaged in horticultural pursuits, and the societies have had the experience of these practical men to guide them in their first steps, but here such is not the case. Here such enterprises are all in their infancy, and we will have to build up our society and our various businesses together, and we should not be discouraged because we can not do either in a single day or a single year. According to our Treasurer's report we had last year twenty paying members, while that famous Montgomery, county society at Dayton, Ohio, that has a national reputation, has been in existence for nearly a score of years and has published its proceedings in pamphlet form for the last decade, had but eighty paying members for the same time. Thus you see that we in our first year have one-fourth as many paying members as this boasted society with such eminent horticulturists as Ohmer and Broadwell, Albaugh, Miss Carrie Brown and a host of others that I might name, to sustain it and build it up. After having heard all the essays and discussions in our society and carefully reading those of the Dayton society, I can not see that ours have been inferior in point of talent and general interest. These discussions have been especially interesting to me; they have brought to mind many reminiscences of my early life. Well

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do I remember the hunt in the little prairies that skirted the woods and in the old meadows for wild strawberries, and when they were found, oh! how delicious!

Probably you never tasted wild strawberries; if not, you have missed a feast. You may talk about your Wilsons, your Crescents, your Monarchs, your Jucundas and your Kentuckys, but never have I tasted a strawberry that was so perfect as those wild berries that we found on the low lands near the old farm thirty-five years ago. And often when we had satisfied our appetites—and that was no small matter in those days, for we had never heard of dyspepsia—we would improvise a basket from leaves and carry enough home, if we could get them, to make a pie. You may talk of your strawberry shortcake, or your strawberries and cream, but give me the old fashioned strawberry pie, made of wild berries, and eaten with cream, such as I have had when a boy, and I will ask for nothing better; and the cream, too, was yellower, thicker, purer and better than any of modern days, although some of you may boast of your Alderneys, Jerseys and Guernseys. And in autumn when wild grapes were ripe and hung in clusters in every thicket, and such diseases as rot and mildew were unknown. Then you could see the small boy with his "bronzed hand and freckled face" going to the woods on double quick to "tickle the palate" with the juicy pulp of the blue grape. In an out of the way corner of our place, where the ground had not been cleared nor cultivated, stood one vine that was better than all others. It was a large vine, covering several bushes and bore bushels of fruit every year. My big brother concluded he would clear out that hill corner and did it so thoroughly that he did not even spare that precious vine, the pride and joy of all the boys in the neighborhood. How long and how ardently I mourned the loss of that vine none can tell. I am not positive that I am ready to throw off mourning for it yet.

For a number of years I, with a number of other children, attended the district school on the Lafayette road, and in going and returning we daily passed on the west side of Mitchell's orchard. In the west row of said orchard next to the private lane through which we passed were trees that bore beautiful crops of vandervers, belleflowers, sweetings, etc., and in addition to these there was another tree, the most remarkable apple tree I ever knew on account of ripening its fruit so early in the season. Usually we think we are getting fruit early if we can have it ripe by the first of July, but these apples were ripe by the last of May and the first of June. It is true they were no larger than medium sized strawberries, and would grow to a very respectable size and turn red by the first of August if left on the tree, but they were ripe by the last of May, at least we so decided and commenced their use at that time. Mitchell was a very clever gentleman and we were on the best of terms, yet we did not take him into our confidence in these fruit transactions. In the corner of one field under the hill near the lane that led to the woods pasture stood an old mulberry tree, or rather a number of trees, the bodies of which touched and interlocked each other and they formed a top as of one tree. Year after year they were loaded with fruit and was the resort of children from all over the neighborhood. How pleasant it was to climb up into its branches to eat fruit and lay in wait for the

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robin; how ruthlessly we shot him with our bows and arrows; we did not then know that he was the farmer's best friend; we only saw him foraging his dinner from the farmer's best fruit and shot him without mercy; he is protected by the law now, he had but little protection then.

One day some bad girls were gathering fruit at these trees, and my mother coming that way they insulted her by ordering her to leave the premises. Straightway I took my ax on my shoulder and cut down every tree, so that the next robin that came that way found no rest for the soles of its feet, and bad children found no more refuge in their cool shade nor pleasure in gathering their fruit. Further out in the field was a cluster of wild plum trees, under which I have spent many happy hours gathering the luscious plums, such as I have never seen since. The watermelons, too, were better than any of modern times. I wonder if it was not my boyish taste that caused all these things to appear better than the same do in these days? Why, I have eaten melons and peaches, as well as apples, perfectly green, and thought them "not only good, but very good." I met with a terrible mishap in horticulture when at a tender age. When about eight years old my brother and I had each transplanted a thorny gooseberry bush from the woods, and each was growing finely and giving promise of a beautiful crop. Our mother told us that if we would dig about them they would grow better. I took a hoe and dug about mine and in about an hour I saw it was wilting, and with all the doctoring I could do I could not save its life, having loosened its roots. This discouraged me, and from that day to this I have had a particular aversion to using a hoe, and do so only in cases of actual necessity.

Last summer I passed by this old farm, but oh, how changed! The old house torn down and replaced, the barn entirely gone and the orchard rapidly decaying. The old walnut tree, under which I have dyed my hands for so many years, is cut down and probably taken to the cabinet shop. Even the lilac bush in whose panicles of bloom the honey-bees and humming-birds used to play hide and go seek, is no more. Every old landmark is gone and most of the old neighbors have moved away or dead. It is home to me no longer, and I will say no more about it. We are now entering upon our second year, and I believe with fair prospects of success if we each of us do our duty, but if we neglect our meetings and trust to some other person to do our duty for us, we will make a miserable failure. Let each of us resolve now that we will succeed, and go to work with a will to perform faithfully each duty that devolves upon us; attend all meetings ourselves; do what we can to get other persons that are interested in horticulture to attend also, then at the end of the year the society will be prosperous or I am no prophet.

THE ORCHARD.

SOME OF THE CONDITIONS OF SUCCESSFUL ORCHARD CULTURE.

[An Address read before the Horticultural Society by Professor H. S. Kritz.]

Any one who has traveled extensively over the country in this part of the State must have observed that in most of the orchards of mature

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growth not more than one-half of the trees, if, indeed, so many, bear anything like a full crop of fruit, while others have but very little, and some none at all.

Now, in a climate so favorable to the growth of the apple as this, after so much observation and experiment, and such wide diffusion of knowledge on the subject of horticulture, it would seem that we might expect better results, and that instead of having our families and markets furnished with this fruit less than half the year, and that, too, with an article often inferior and in many cases worthless, we might enjoy an abundant supply in rich succession throughout the year, and have a large surplus for other localities less favorable in soil and climate to its production.

At a time of so great prosperity among our farmers, when many of them are adorning their homesteads with new residences, some of which would grace the finest avenues of our cities; when the last relics of pioneer life are rapidly disappearing and an era has approached in which refinement and cultivated tastes are to become as common among our rural population as among the more favored denizens of the city, it should hardly be necessary to remind them how indispensable both to the comfort and appearance of these improved homesteads will be new plantations of trees, freighted in their season with a succession of the choicest fruits, adding their beauty and fragrance to the landscape, and contributing to the health and enjoyment of their fortunate possessors.

Great and rapid as have been the growth of this Commonwealth and the development of her natural resources, they are trifling when compared with what they must be in the next fifty years, if those to whose hands they are now transmitted by the pioneer fathers, the last of whom are fast passing away, shall be faithful to the trust committed to them.

Containing, as it then will, a population of not less than three millions, the imagination can scarcely picture the busy scenes and the thronging multitudes of her crowded cities; the beauty of her broad and smooth highways; the magnificence of her splendid suburban villas, and the richness and verdure of her cultivated fields and orchards. In order to the realization of such an ideal, there must be the production of a new species of farming, whether to be brought about by some process of evolution and the "survival of the fittest," or by a more careful study of the character of elements of the soil and the nature and growth of plants it matters not. The time has been when the cultivator of the soil, though utterly ignorant of the forces of nature and the laws of vegetable growth, might expect a reasonable reward of his labor by complying with only the most ordinary conditions, but the time has now come when farmers and fruit growers, as well as others, must, in order to successfully comprehend the principles which underlie their business, be acquainted with the nature and elements of the soil and understand the laws and conditions of vegetable growth, and they ought not longer to suppose that Providence will wink at their ignorance in this respect.

It is now somewhat more than fifty years since the first settlements were made in this part of the State and the oldest orchards planted out. There are probably but few that are as old as fifty years. The trees of many of these early plantations were raised from seed brought by the pioneer settlers

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from the older States, those of others were obtained from such nurseries as then existed here, and some were made from suckers or sprouts separated from the roots of trees in the orchards of neighbors. The average early settler seems to have had very indefinite notions about fruit raising; almost any thing called by the name of apple filled his ideal of this most indispensable fruit, and excited his faith in hope of abundant harvests. He was more concerned to plant *apple trees* than he was as to the kind, or where, or when, or how they should be planted. And having placed them in the ground, feeling that he had done a good work, he rested complacently in the hope that they would in their own time and way, aided only by the forces of nature, bless his vision with their branching boughs bending beneath their clustering fruitage. In accordance with the divine principle both of nature and morality that "whatsoever a man planteth, that shall he also gather," there were many grievous disappointments, yet in most cases—such was the adaptation of our climate to the growth of the apple, and so great the fertility of our then rich, loose, virgin soil—where the trees planted by the early settlers were not positively worthless, abundant crops were produced year after year of fruit then considered of fair quality. The trees of many orchards more recently planted were brought from distant parts of the country, and they have often been found after years of waiting for them to come to maturity not well adapted to the soil and climate of this locality, and have proved in many cases not only shy bearers, but also worthless in quality.

Not only have we been too careless in the selection and planting out of trees, but very little intelligent care has afterwards been bestowed upon their orchards by the majority of our farmers. Many have suffered them to go untrimmed until they have become a mass of matted brushwood, so dense that only a little stunted fruit is seen to grow on the surface. Others have suffered them to be recklessly and indiscriminately slashed, till whatever of symmetry and beauty they may once have had have been destroyed. Many trees have been planted in low and flat grounds without natural drainage, where, after struggling for a time, they have at length been drowned out; others, if not originally planted out in some grass plat, have been suffered to grow amid the grass from year to year till they have been well nigh starved or smothered to death. Some have been pastured by stock of every species, both in summer and winter, till the ground about them has become as hard as the public highway, and their peeled trunks and maimed and mutilated branches seem to cry to the very heavens for protection. To such an extent has this carelessness prevailed that it is a rare sight to see an orchard of well trimmed, vigorous, symmetrical trees more than twenty-five years old, and yet an orchard ought to be only in the prime of its vigor at the age of fifty years.

Whatever may have been our neglect and the causes of our comparative failures in the past, the present demands the adoption of a different policy. Land at the rate of $50 or $75 per acre, is too valuable to be subjected to such treatment, or suffered to lie in partial unproductiveness. Every cultivator of the soil who has been at the business for any length of time, knows that his land now requires a different kind of cultivation, and much more of it in

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order to produce the same amount of wheat or corn from what it did twenty-five or thirty years ago. Then the soil was light and porous, and being full of vegetable matter, and rich in the salts required by vegetation, abundant crops of grain and fruit were produced with but comparatively little effort. Now we find in most places our lands exhausted of these elements, and requiring underdraining; subsoiling and constant fertilization by a judicious rotation of crops, or the liberal application of manures and other fertilizers, in order to secure the most profitable results. Fruit growers, whether farmers or horticulturists, should understand the causes of this changed condition of the soil, and before making a plantation of trees should even more carefully prepare for it than for a crop of wheat or corn, inasmuch as it is to remain a fixture for years. Scarcely any attempts have as yet been made in this part of the country, even by the most intelligent and progressive of our farmers, at systematic underdraining as a means of fertilizing and improving the mechanical properties of the soil. Much draining, it is true, has been done for the purpose of removing surplus waters from swampy places, and sloughs which would otherwise interfere with cultivation, especially in wet seasons, but where have any attempts been made so to underdrain our lands so that the rains may be absorbed by the soil instead of passing off by surface drainage, or by evaporation?

A large per cent of the most valuable ingredients of the soil is washed out and carried off annually to other parts and down to lower levels by surface drainage. Underdraining would effectually remedy this by greatly increasing the capacity of the soil to absorb and quietly carry off the water from not being allowed to remain saturated with it, or to become baked and hardened by the process of evaporation. Indeed the soil may be made, by proper drainage, like a vast filter in constant operation, gathering from the waters all the fertilizing elements, taken from the surface and absorbing the gasses which would otherwise be carried away by the atmosphere. My conviction is, that it will well repay any one who intends to plant out an orchard to underdrain thoroughly by sinking a trench not less than three feet in the middle of each space between the rows, thus securing the speedy removal of all superfluous moisture and placing the tiles beyond the influence of the roots. If this should be followed by subsoiling to the depth of eighteen or twenty inches, and in cases where the soil has been, by long and careless cultivation, exhausted of the salts and other elements required for the growth of the trees and the production of the fruits, if these should be supplied by the application of proper fertilizers, all the conditions of the vigorous growth and rich productions of our virgin soils would be restored. The objection will, perhaps, be made that this would require too much labor and expense; but nowhere does the old adage "That what is worth doing at all is worth doing well" find so ready and practical an application as here.

Next to this thorough preparation of the soil I would recommend the utmost care and attention in the selection and planting out of the trees. Those raised by reliable nurserymen in one's own locality are on many accounts, I think, much to be preferred. By procuring them at home one may personally inspect his purchase and know just what he is buying; may select trees of such age, size and shape as he desires for transplanting and such varieties

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as are known to be hardy and productive; may avoid the necessity of having the trees too long out of the ground, and the rough handling and bruising incident to shipping. It is a bad method, as I know from experience, to select varieties from the glowing descriptions given in most books on the subject, or to rely on the statements of the agents who represent the large Eastern nurseries, and the splendid specimens which they carry about with them. What is a choice variety in one locality will often prove to be worthless in another at a distance from it. Too much care can not be exercised in the selection of trees of the right size and shape for transplanting. A large part of the trees in many nurseries would not be worth taking home at any price. Some form their tops too low, others too high; some have a double top and again others, like saplings in a crowded thicket, have almost none at all.

Our nurserymen, by the exercise of a little more taste and labor, might greatly improve their product in this respect and avoid the accumulation of a great deal of worthless stock. Well-grown, thrifty trees, two or three years old at the farthest, which may be easily made to form handsome sym metrical heads from three to five feet from the ground, according to the habit of growth of each variety are most desirable. Trees are often greatly damaged and their subsequent growth much retarded by the careless manner of taking up and transplanting. This work should always be done in the spring, as soon as the ground is in good order for working. If the trees are well planted before the season is too far advanced, and properly cultivated afterward, they will seldom fail to live and make a fair growth the first summer. The precision with which they are set, both as to uprightness and directness, will be a fair index to the taste and character of the fruit grower. Important as the conditions are which have already been mentioned, success will be only partially insured unless others yet to be mentioned shall also be carefully observed. Such a method of cultivation must be adopted as will best secure the proper growth and rapid development of the young trees, and at the same time retain, and even improve, the fertilfty of the soil.

It is a great mistake to suppose that fruit trees, unlike other forms of vegetation, do not need cultivation, and it is perhaps a greater one to suppose that while trees are coming to maturity the ground may be cropped year after year much the same as if no planting of trees had been made. An orchard should be cultivated regularly till it comes into bearing and may be cropped with light crops that do not exhaust the soil, but unless the ground is naturally very strong, crops of corn and other small grain should not be raised.

After an orchard begins to bear it may from time to time be sown in clover and pastured with hogs in the summer, that they may gather up the falling fruit which contains the larvæ of injurious insects, but this should not be allowed to stand more than two years without breaking even though the ground be not cultivated, and *never* should an orchard be allowed to become set in grass either for meadow or pasture.

If the ground is poor, manure should be applied, especially around the trees, and if the whole surface be covered so much the better. If the trees incline to be rough and mossy and do not make a vigorous growth some

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stimulant is required that will impart more vigor and restore them to a healthy condition. Washing the trunks and branches with strong soap suds will generally render the bark smooth and healthy, will destroy multitudinous insects and imparts wonderful vigor to the whole tree.

In regard to pruning so much diversity of opinion prevails among fruit growers as to the objects, the reason and the manner of it, that more time than is allowed at present would be required for its consideration. As between pruning and no pruning, however, it may be here said that judicious pruning is just as necessary to the growth and development of the young tree as the training and culture to the child, and if it is carefully attended to at the proper time, but little will be required when the tree has grown to maturity.

It is confidently believed that, if the conditions here set forth were fully accepted and faithfully carried out, the value and productions of our orchards would be increased many fold, and fruit raising for profit would soon become one of the most remunerative of all our agricultural industries.

GRAPE CULTURE.

HOW TO CULTIVATE A FLOURISHING VINEYARD—THE CARE, LABOR AND SKILL REQUIRED.

BY PROF. D. A. BASSETT.

Before entering upon the cultivation of the grape, it should be understood that care, labor and skill are indispensable to success. Those large purple clusters, which so delight the eye and cheer the heart are not the result of chance, but the reward of care and toil skillfully applied. Skill is requisite in every department of grape culture, and being the result of knowledge and practice, may be acquired by any one sufficiently interested in the matter.

The most favorable locality for the cultivation of the grape is admitted to be the side of a hill with a southern exposure, a rich bearing soil and rocky subsoil, mostly of lime. Such a spot produces the best results, both in quantity and quality. The hill should be terraced, digging up the soil two or three feet deep, and enriching it with *thoroughly composted* manure. After settling two or three months it is ready for the vines.

In this section of the country, this beau ideal of the locality for a vineyard can seldom be realized, yet good, delicious grapes in fair quantities may be raised in almost any of our gardens and on almost any of our farms. In selecting a spot for a grapery, the above standard should be kept in mind,

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and the plat selected should conform as far as possible to these most favorable conditions. Low, flat ground and a heavy clay soil are unfavorable to the growth of the grape. But if a spot can be found with a southern exposure and sufficiently elevated to admit of good drainage, excellent results may be obtained. The underdraining is an important matter where the soil is heavy and damp. In preparing the ground for the vines, holes or trenches may be used. In either case the method is about the same. The holes should not be less than four feet in diameter and three feet deep. The top soil may be preserved for refilling the holes, but the hard clay underneath should not be used for that purpose. And since the grapevine delights so much in a lime subsoil, it is advisable to remedy any defect in this particular as far as possible. For this purpose refuse lime, old plaster or mortar, and old bones may be used to good advantage. Ox heads from the slaughter yard, one in each hole, turned with the horns downward, have been tried with very great benefit. The roots of the vines penetrate them in every direction. To the top soil which has been laid aside, rich loam from the creek or river bottom should be added, and a sufficient quantity of thoroughly composted manure to render the whole mixture very rich. There is little danger of overdoing in this direction. With this compound, well mixed and pulverized, the holes should be filled heaping full and then allowed to settle. It is best to prepare the ground in the fall and plant the following spring.

The ground prepared, then comes the planting, and with it the question, shall we plant cuttings, or roots? The best authorities with which I am acquainted prefer the cuttings. While the roots will yield fruit a year or two sooner than the cuttings, still it is claimed that it does not compensate for the injury sustained by the young vines in transplanting, from which they recover but slowly. Without doubt the cuttings are preferable, if properly selected or prepared. The earliest shoots of the season, smooth, hard, fine-grained and thoroughly ripened, should be selected. These should be cut as close to the parent stalk as possible without injuring it. From eighteen to twenty inches is the proper length, and each cutting should contain from seven to ten full, firm buds, those at the bottom being closer together than those higher up. It is best to leave at least two inches of the wood above the upper bud. It may not be amiss to add that large, coarse-grained shoots are unfit for cuttings.

Experienced grape growers regard the setting, whether of cuttings or plants, as an important part of grape culture. The ground should be in perfect order, and in no case should the setting be done when it is wet. With the spade remove the soil from the holes deep enough to receive the cuttings full length or nearly so. The fine, pulverized soil may be firmly pressed around them, but not stamped, and should cover the last or top bud about an inch. A pretty free use of water is advisable while setting either plants or cuttings. If roots are used instead of slips, sufficient dirt must be removed from the holes to allow the spreading out of the fine roots to their original position, which is nearly horizontal in plants of one or two years growth The distance at which the vines should be placed from each other depends upon the mode of future training. If they are to be staked, which is the

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usual method for field culture, from four to five feet each way is a good distance. For trellises they require more room. And without entering upon any discussion of the subject, I do not hesitate to recommend the Spring of the year as the most favorable season for planting.

When the plants are in the ground the soil around them should not be disturbed until the young shoots are well above the surface. And while it is important that they should be tended through the season, and the soil kept loose and free from weeds, yet care must be taken not to snap off the tender shoots. If the season should prove dry mulching is indispensable, and frequent watering may be necessary. It is not a good plan to exhaust the soil by cultivating vegetables or anything else among the vines. This is frequently done, but it is a species of robbery by which the product of the vine is injured, both in quantity and quality. Experience convinces me that garden vines of almost every kind are injurious to the grapevine, and especially is this true with regard to the tomato and potato vine.

Pruning is an important item in grape culture, and no less important in the early stages of growth than in the more advanced. Early in the spring of the second year all the growth of the previous year should be removed with a sharp knife, leaving but *one bud* on the stalk. This bud is to form what is styled the *head* of the root. From this head will start up at least two shoots. If more than two start it is best to remove them at once. Early in the spring of the third year these two shoots should be cut back so as to leave but one or two buds on each. The fourth year the vines will be ready for the stakes or trellis. If table grapes are desired the trellis is preferable, and upon these the vines may be trained according to fancy. In all future pruning three things should be remembered.

First. The proper time for pruning is late in the fall or early in the spring.

Second. The growth of one year produces all the fruit buds for the next crop.

Third. The strong, healthy and thoroughly ripened branches of the last season's growth should be selected for the vintage of the next year. All other branches should be removed and those should be cut back leaving not more than four buds on each. Care must be exercised in this process lest the vines be overloaded, especially when young. If overloaded, the fruit will be small and of inferior quality.

When the young grapes are fully grown, or nearly so, it is best to remove with a sharp knife, "every branch that beareth not fruit," that the strength of the vine may be absorbed by the bearing branches. And each of these bearing branches should be pinched off at the second or third joint from the clusters. During the hot days of July and August the first is liable to speck and blight. At the first appearance of this, thin out the heavy foliage and let in the sunshine. I have invariably found this an effectual remedy, if attended to in season. Be careful in this operation not to remove such foliage as will expose the clusters previously shaded, to the direct rays of the sun. In training vines upon the trellis, experience seems to indicate that the higher they are carried the better will be the results both in the size and fullness of the clusters and the quality of the fruit. The vine, being constituted

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for climbing, seems to concentrate its best energies into the highest branches. Any one who has noticed vines growing upon trees, must have observed this fact. Besides, this high training removes the grapes, in a measure, beyond the reach of injurious insects who destroy the clusters. These insects are sometimes very troublesome, and various plans have been devised to shield the fruit from their depredations. For this purpose the paper bag seems to be a success. Last year I tried the experiment, slipping the paper bags over several clusters and tieing them closely around the stem above. In the fall the bags were removed and the clusters were found to be perfectly ripe, full and of excellent flavor. I think I may regard the paper bags as a success, but I think they will be found unnecessary where the vines are trained upon trees or high poles.

In this section of the country our grapes are liable to be injured by late frosts. I know of but one remedy for this—to trim the vines about the first of December, and lay them down and cover them with a light coating of straw, and let them remain under the straw until after May 10. In this way the vines escape injury through the winter as well as the late frosts. I have practiced this for six or seven years with complete success. When the season is earlier than usual, the young shoots start while under the straw. One season they were almost ready to bloom when taken up, and the results were very satisfactory. Of course, when the young shoots have started the vines must be very carefully handled, as the least touch snaps them off.

The honey bee is sometimes very troublesome in the grape arbor. He is such a busy, industrious little fellow, and so social withal, that a few days will suffice to ruin the crop. These little fellows did so much damage in my arbor one season, that it led me to study their habits very closely, and after six years of observation, I have pretty much concluded that they will not attack the grape uninvited. To determine this point, the vines were watched closely during the ripening season, and all defective grapes removed. Special care was taken that no grape skins, nor pulps should be left under or about the vines or in the vicinity. For a year or two this plan succeeded so well that our grapes were not molested. Another time, however, they did us much injury notwithstanding this precaution. But upon careful examination, I discovered that the grapes, that season, were nearly all cracked open, some so slightly as to require careful examination to discover the opening. Since that time I have guarded both of these points and have had no further trouble with bees. My observation and experience in this matter confirm me in the opinion that the bee will not puncture a good sound grape. If, however, it should be found that I am mistaken in this matter, I shall resort to the paper bags, which are not only a protection against bees, but also against all other insects that work upon the fruit.

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HORTICULTURAL MEETING LAST SATURDAY.

REPORT ON THE CONDITION OF THE FRUIT—HOW TO RAISE POTATOES.

The Montgomery County Horticultural Society held its monthly meeting in the County Superintendent's room in the Court House last Saturday. Owing to the room being occupied by the County Board of Education the society did not hold any session in the forenoon. The meeting was called to order at 1:30 o'clock, Prof. Bassett presiding. J. C. Maxwell and James Calloway from the fruit committee reported that the fruit was not materially injured by the late frost, which was corroborated by Prof. Kritz.

Col. Blair from the committee on vegetables reported that owing to the lateness of the spring there had been but little progress made in gardening. Col. Blair next read an essay on potato culture.

Prof. Kritz said that his potatoes raised on a small plat yielded at the rate of four to five hundred bushels to the acre. He did not think he would plant potatoes as the writer recommended. He wanted a good deep bed well pulverized and laid off one way only. In this he plants his hill about sixteen inches, putting two pieces of potato in a hill about six inches apart. A deep rich soil, early planting, early and thorough cultivation are the main requisites for a good crop of potatoes. He planted Early Rose for early and Peachblow for late or winter potatoes. He thinks this region admirably adapted to its culture. Col. Blair said that he could get just as good potatoes from small seed potatoes as from large ones, which was discussed to a considerable extent with various experiences given.

Professor Bassett said that when a boy he was a farmer and often raised from four to five hundred bushels to the acre. The ground was thoroughly pulverized. They planted just such sized potatoes as they preferred to eat, and planted them whole. He deprecates cutting potatoes for seed. In planting them whole the starch is all preserved, which is the proper nourishment for the young plant. P. S. Kennedy had been raising potatoes ever since he was big enough to use a hoe. He thinks the best crop of potatoes he ever raised was planted in hills two by three feet, but thinks the main point is good ground and thorough culture. John Townsley said that he generally cut his potatoes a week or two before he planted them, and rolled them in plaster of Paris to prevent the substance from wasting away. He would rather plant an early potato about the last of June for winter use. In answer to a question, he said that he could keep an Early Rose until that time by pulling off the sprouts as they appear.

Prof. H. R. Thomson next read a very able paper on agricultural chemistry which he promised to prepare for publication in next week's *Journal*. The moon theory in planting was generally ridiculed by the society. If it had an advocate present he very wisely held his peace. The next meeting

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was appointed at the new fair grounds on Wednesday, May 19, at which time it is expected that the Horticultural Society of Indianapolis will meet this society. A committee consisting of J. C. Maxwell, Jas. Calloway and A. J. Royalty were appointed to receive said society and conduct them to the place of meeting. Frank Gill and Prof. W. C. White were appointed additional essayists for the June meeting. After a general discussion on the benefits and objects of lime, salt, etc., to soil, the society adjourned.

DELAWARE COUNTY HORTICULTURAL SOCIETY.

ITS ORGANIZATION AND CHARTER MEMBERS—ITS OBJECTS AND BENEFITS—ORDER OF EXERCISES, ETC., ETC.

The Delaware County Horticultural Society was organized in April, 1880. The charter members were H. J. Lockhart, Dr. Will A. Egbert, Granville Cowing, D. R. Pershing, Stephen Hathaway and John Fullhart, of whom D. R. Pershing was chosen President, Granville Cowing, Vice-President, and Will A. Egbert, Secretary, John Fullhart, Treasurer, and Stephen Hathaway and H. J. Lockhart, Executive Committeemen. Evan T. Babb was afterwards elected as the other committeeman.

The first regular meeting was held at John Fullhart's, and was an occasion of much interest and social enjoyment, it being the strawberry season. Each subsequent meeting has been more interesting and attended with increased membership, and the most flattering prospects of success.

THE OBJECTS OF THE SOCIETY.

Are, first, the cultivation of fruits, flowers and garden products (as its name implies a garden or gardening.) Second to disseminate useful information among its members in regard to the best varieties, produce, and the most successful methods of cultivation, and to the proper manner of preserving the same for future use. Third, to

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cultivate a more intimate acquaintance among its members, and to enjoy a rest from the toils of the garden and fields. But not least among the benefits conferred by such a society is the dignity with which it crowns him who tills the soil. Scores of our young men desert the farm simply because they imagine that farm labor will lower their social standing. These meetings, in which intelligent men and women bring their influence, hearty sympathy and support must do much to arrest such a false sentiment.

THE SOCIETY

Is migrating in its character, and holds its meetings with its members—in the warm part of the year in the country; and during the cool and wintry season in city, (and with those who may solicit its company for the next meeting.)

All regular meetings are held on the first Wednesday of each month. The members bring their baskets well filled with eatables; also specimens of fruits, flowers and garden products; the latter for the inspection of special committees, whose duty it is to examine and report on their merits for beauty and excellence; the former to be discussed by a committee of the whole at the close of the business of the society.

After assembling and a few minutes chat among the members, the society proceeds to business, which is arranged in the following manner:

1. Roll-call.
2. Reading of the minutes of the previous meeting.
3. Unfinished business.
4. Reports of special committees.
5. Report of standing committees.
6. Communications and correspondence.
7. Essays by one or more of its members who have been designated at a previous meeting to prepare such.
8. Discussion.
9. Miscellaneous business.
10. Examination of specimens presented for exhibtion.
11. Arrangements for next meeting.
12. Adjournment.

After which, together with invited guests, all arrange themselves for refreshments, which is not usually the least interesting part of the programme.

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The meetings have been very interesting and well attended since its organization, and the society prospering in the increase of its membership and social bearing of its members toward each other. It now numbers about sixty, and many among them are of the best citizens of the county, who hope to see its membership increase into the hundreds, and express themselves as gratified with the work already accomplished, and expect to continue until horticulture shall be the pride of our young men and but few may be found forsaking their country homes for city life.

May it continue to prosper until every field shall be as a garden and every garden shall bloom as the rose.

MEETING OF THE HORTICULTURE SOCIETY.

MUNCIE IND., JAN. 5, 1881.

The tenth regular meeting of the Delaware County Horticultural Society met at the residence of John Husted, in the cityof Muncie. The society was called to order by the President at 11: 15. After roll call the minutes of the previous meeting were read and approved. This being the first regular meeting after the annual election, the President delivered his annual address, the same being a well-written article upon the subject of education in the line of horticulture, contrasting the fruits of thirty years ago with the fruits of to-day. After some complimentary comments on the address, the committeemen of the special committees reported. Dr. Foster, on small fruits, reported a few bunches of the Prentiss Grape, it being a very hardy and good producer, and of excellent flavor. The grape was exhibited by Dr. Hathaway; color of grape, white, and very large bunches. Mr. Fullhart said he did not exactly know what his duties were, and asked to be instructed. Dr. Foster said he thought each committeeman should write out a report of each exhibit at the next meeting.

Rev. F. T. Simpson then read an instructive essay, giving Biblical quotations in harmony with horticulture.

Mr. Cowing wanted to know what would prevent rabbits from destroying young trees. The only sure remedy was to kill the rab-

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bits. Mr. Fullhart thought a query box should be introduced, as a great many questions would be asked by its use, that would not be asked in any other manner, and on motion of Dr. Foster it was voted that such a box be established.

Dr. Hathaway read a history or synopsis of the proceedings of the society that will be printed as a part of the history of Delaware county.

Dr. Foster read a report of the proceedings of the State Society as seen by himself and Mr. Cowing, the representatives of this society.

On motion of Mr. Fullhart the essays and report of this meeting were ordered published in the county papers.

Mr. Vance reported that fruit in cellars was keeping nicely. He exhibited an apple that Mr. Beavers sent for a name, also a sample of the Ben Davis. Mr. Vance wanted to know what he should do with his frozen apples. Mr Marsh said they would make excellent jelly. A discussion then took place on the question, "Which are the best three varieties of apples?" Dr. Hathaway said if he was going to plant three varieties they would be the Ben Davis, Smith Cider and Wine Sap. Mr. Vance was not a friend to the Ben Davis; didn't think it any better than the Grindstone. He thought we ought to raise apples most suited to our neighborhood, regardless of financial profit. Mr. Marsh thought it best to produce those varieties, which would pay us the most money, regardles of quality. Mr. Fullhart was a great friend to the Ben Davis, but could not praise the Wine Sap, as his experience was limited; would leave out the Smith Cider and plant the Baldwin instead. Some objections were made in regard to the keeping qualities of the Baldwin. Mr. Fullhart said if they were gathered early they would keep; said also that red apples sold better in market than yellow ones, with the exception of the Bellflower. Mrs. Walter March suggested that as so much had been said for and against the Ben Davis, a specimen should be passed around to be examined and eaten. After this had been done it was voted to be a splendid apple, both for its beauty, size and quality.

Mrs. Fred Putnam extended the invitation for the society to meet at her residence at the next meeting. Invitation accepted.

There being no further business before the society, meeting ad-

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journed to meet at Mr. Fred. E. Putnam's on the first Wednesday in February.

After partaking of a sumptuous repast and spending several hours in social conversation, the different members departed for their respective homes, feeling that they had spent a pleasent and profitable day.

Dr. Foster was appointed essayist for the next meeting.

W. A. EGBERT, Sec'y.

PUTNAM COUNTY HORTICULTURAL SOCIETY.

At a called meeting of citizens of Putnam county, held in the city of Greencastle January 25, 1881, for the purpose of organizing a Horticultural Society, at which a number of persons were present, a committee was appointed on constitution and articles of association. An adjournment was then agreed to until February 12, at which meetings a permanent organization was affected, twenty-four members signing the roll. J. B. Johnson, of Greencastle, was elected President; J. W. Randolph and W. A. Workman, Vice Presidents; John W. Ragan, of Fillmore, Secretary, and Prof. J. B. Demotte, Treasurer.

The faculty of Asbury University tendered the free use of West College Hall as a permanent place of meeting.

After remarks by a number of members concerning the advantages to be derived from such an organization, in which all agreed that great good must result through their labors, it was, on motion, agreed to adjourn to meet in West College Hall on Wednesday, March 16, 1881.

On Wednesday, March 16, the second monthly meeting of the society was held, President Johnson in the chair. There was a fair attendance of members and their families, with some visitors; also a good exhibition of fruits graced the tables from the orchards of J. H. Priest, J. W. Ragan, T. E. Talbott, T. C. Grooms, W. A. Workman, J. B. Johnson, T. H. Pierson and R. S. Ragan.

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A discussion of some length, participated in by a number of members, followed the reading of a paper by W. A. Workman on the damage to the coming fruit crop by the past winter, in which great anxiety was generally expressed through the apparent damage sustained, not only to fruit buds but also to trees, vines and plants. R. S. Ragan read a paper, which we herewith append, on the pioneer horticulturists of Putnam county.

J. W. RAGAN, Secretary.

PIONEER HORTICULTURISTS OF PUTNAM COUNTY.

Mr. President, Ladies and Gentlemen of the Putnam County Horticultural Society:

At your request I take pleasure in presenting a few homely and crude thoughts on the subject of the early horticulturists of the County of Putnam. First in order, as well as in rank, is Reuben Ragan, who immigrated to this county from the central portion of the State of Kentucky about the year 1821 or 1822. He came, a single man, on horse-back, about two hundred miles, a large portion of the way a wilderness and along a mere path, and among Indians and wild beasts, with a rifle and ax (two indispensable articles at that day) together with a few articles of clothing and also seeds and grafts, all except the gun, contained in a pair of saddle-bags. Thus equipped, one of the most eminent pomologists in the western country came to Putnam county.

The first thing after clearing away a small spot was to plant his precious seeds of the apple, pear, peach and cherry, as also those of the floral and culinary departments. He also reared a small log cabin, in which he, for some years, kept bachelor's hall, as it was then termed. Until he married, he was in the habit of spending his summers here in improving his little homestead (eighty acres of land) and returning to and spending the winters with his friends in Kentucky, where he usually spent much of his time visiting and gathering seeds and grafts to increase his then small stock of fruits, etc. He was soon, say about three years from the beginning, enabled to furnish this and adjoining counties with the most valuable varieties of fruits; and hence it has been a very remarkable fact that Putnam county has had fewer seedling orchards at the beginning than almost any other county in the State, for the simple reason that one of its first settlers had the enterprise to be able to furnish them with the most valuable varieties right at the beginning and at home. For then there were no railways bringing agents to sell trees and flowers as now. His education, though as good as his country afforded, was not what is now considered a liberal one. Although possessed of but few

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books, yet those he had were well studied, read and re-read until well nigh memorized. He possessed a native genius very rare indeed. His powers of analysis were of the highest order, and if he had enjoyed a higher order of culture in early life, would most likely have made his mark among the first men of his profession. As before stated, his powers of observation and analysis were so acute that he always impressed the most skilled and cultured by his nice powers of discrimination. So acute and accurate were his observations and powers of distinction, that he was enabled most readily to distinguish and recognise almost every variety ever handled by him any considerable length of time as readily as, he used to say, he could the distinctive features of men.

Among his brother horticalturist of Indiana, (for they were a band of brethren,) he was universally regarded as an umpire in settling disputed points. Mr. A. H. Earnst, the proprietor of the celebrated Spring Garden Nursery of Cincinnati, once changed the labels upon more than one variety of apple trees in his nursery by having him point out the mistake and fully convincing him of the correctness of his decision. Such was the triumph of his powers of discrimination over one of the most learned and life-time pomologists in the West at the time—willingly and cordially yielded in the face of the facts plainly pointed out. Henry Ward Beecher, while living at Indianapolis, after having met him and conversed with him by the hour, and having visited him and heard and seen his manner of *business*, at home; said of him, that he was the best *practical* horticulturist in America. From a long and intimate acquaintance with him by your reader, at this hour, he is able to add his testimony that such encomiums, (if they may be so called) were not alogether unmerited. He was also the first discoverer and setter forth in Hovey's Horticultural Magazine in the year 1843, if I mistake not, the generally recognized theory of that much dreaded disease of the pear tree known among horticulturists as fire, or frozen sap blight. So satisfactory was it regarded at that day that Mr. Charles Downing, of Newburg, N. Y., one of the ablest and most distinguished pomologists in America to-day, when publishing a revision of A. J. Downing's well known book in 1866 on Fruit and Ornamental trees, adopted as though established, his theory, in the main, and refers to him in the following manner on page 416, to-wit:

"Mr. Ragan, of Putnam county, Indiana, has for more than twelve years suspected that this disease originated in the fall previous to the summer on which it declares itself. During the last winter Mr. Ragan predicted the blight, as will be remembered by some of his acquaintances in Wayne county, Indiana, and in his pear orchard he marked the trees and the spot where the disease would be located, and his prognostications were strictly verified. Out of his orchard of two hundred pear trees, during the previous blight of 1832, only four escaped, and those had been transplanted and had, therefore, made little or no growth."

Your reader was with him then, in 1843, and assisted in making these observations. Dr. J. H. Robinson, of Floyd township in this county, was also a student of his, living with him for several years and saw and heard him predict and point out the most of these facts and is another living witness of his wonderful powers of observation. He lived and died on a

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farm, which showed, perhaps, more real tastefulness and good culture than any other in the county. But his delight was in the garden and among his trees, of which he was passionately fond. He often remarked that this is a most pleasant world. But it is just what men make it. It can be a paradise or a hell. God has made all things well and it only remains for men to collect, arrange and dress them up. The good and the beautiful are all here. It only remains for them to be brought together and utilized. His passion for the good and beautiful was so strong that not more than an hour before he breathed his last, when presented with a flower he exclaimed how beautiful! This was his last utterance. During his entire life his greatest delight was to roam among his flowers and fruits and gathering them for the adornment of the dwelling and table. From many years' observation it seems that nearly all horticulturists become enamored of their calling.

It is an employment which gives more real worldly comfort than perhaps any other, for it brings along with it more of the comforts of life than perhaps any other. It elevates and refines the tastes of both man and woman. It is certainly more so than mere agriculture. I have said thus much and might say much more of the much lamented Reuben Ragan, yet there are others deserving honorable mention here in this connection. A few of the more prominent shall have a brief mention. And next is Wm. Aldridge, of Floyd township, who was a nurseryman of a few years standing; was a gentleman of little culture but of high moral worth. He only continued in the business a few years and hence accomplished but little worthy of note.

About the year 1840 a Mr. A. H. Nichols came from New York and settled on the farm now owned by A. S. Bryan, better known as the Matson farm. He was a gentleman of more than ordinary culture and brought many new things to this county, and was a man far ahead of his day in his elevated notions of advanced farming and horticulture.

There being little or no reward at that time for his advanced mode of farming he failed and lost his farm and left here.

Prof. W. C. Larabee was another man of a high order of culture and was far in advance of his day here. Such men would now find ample room for their enterprise.

Dr. J. H. Robinson is about next in order and about second only in rank; is a student, as before stated, of Reuben Ragan, and is to-day perhaps one of the most intelligent horticulturists in the State. He it was who first introduced into this county the now famous Ben Davis and Rheinish May apples and now has a new plum which gives promise of being a valuable acquisition to plum culture.

Col. J. A. Matson was also worthy of mention in this connection.

About 1855 or 1856 Mr. Eli Daggy started in the nursery business in South Greencastle, and pursued that business for only a few years, when he removed to the State of Illinois. He was a gentleman of considerable promise as a horticulturist. These are about the only men who deserve to be styled pioneers in this line.

We, however, have several persons who have more recently embarked

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in horticultural pursuits, the principal of which I will only mention here, to wit: Wm. Matkin, J. H. Priest, J. W. Carver, T. H. Pierson and W A. Workman, all of which have entered the field with a most commendable zeal.

I have extended this paper beyond my intention, and I could say much more, but must close here for the present. R. S. R.

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